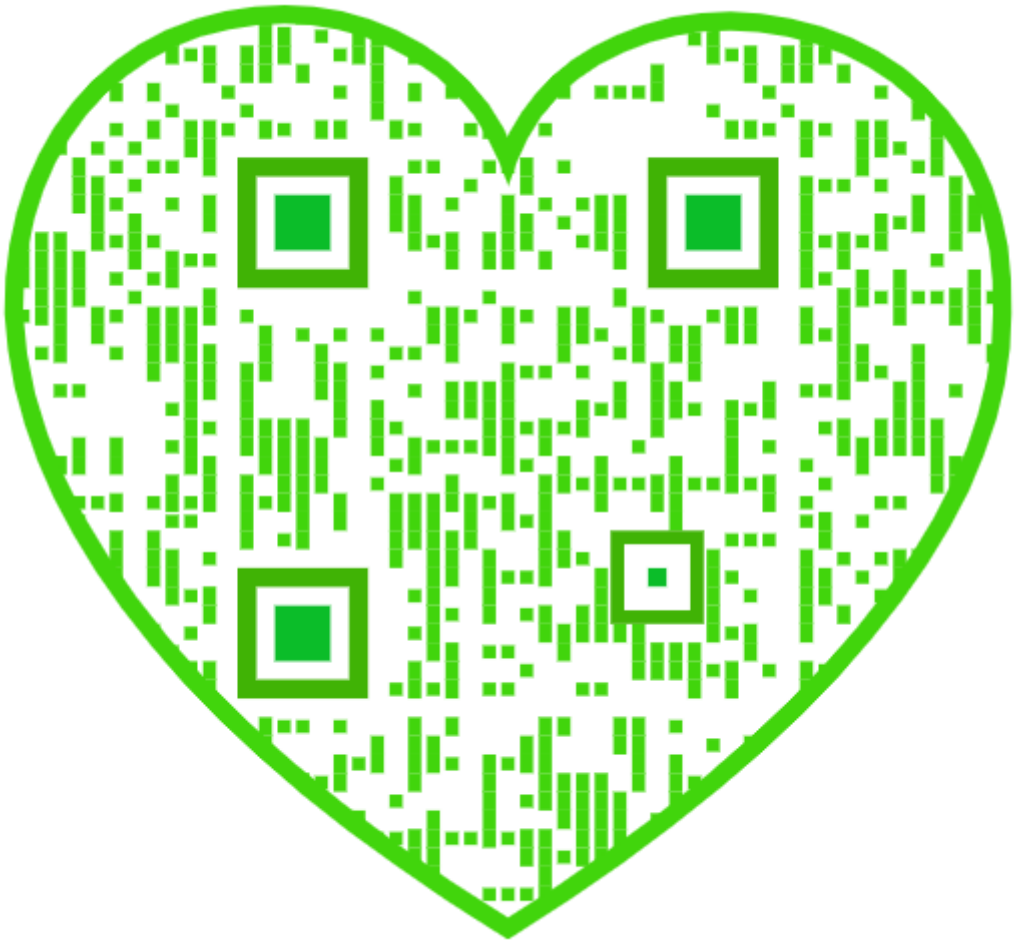
Synopsis of Obstetrics



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UNIFORM SERIES NO. I.

A SYNOPSIS

OF

OBSTETRICS

INCLUDING

ECTOPIC GESTATION

PREPARED FOR THE AID OF THE BUSY STUDENT AS
A BASIS FOR NOTES UPON HIS WORK

SECOND EDITION

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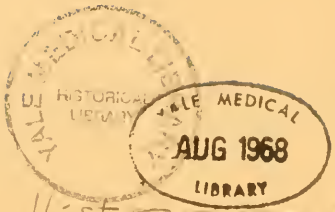

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Pre-Natal Word

THIS little volume may be born to fill a long-felt want—and it may not. It is the outcome of a suggestion made some time ago to publish a uniform series of notes upon the college work, covering, if possible, most of the departments of the school. This is the firstborn of the family.

Every student recognizes the importance of well kept notes on his college work, and as he enters into his practice his notes become of still greater value to him. Many students have expressed regret that they have been unable to record even the more important items in their work. This outline, it is hoped, will serve as a basis upon which an intelligent report can be built, and at the same time be of convenient size and of sufficient attractiveness to deserve, when corrected and enlarged by the student himself, a place upon his book-shelves.

But, fellow students, this booklet is only the baby placed in your hands. Be a father to it; clothe it as you see fit; correct it freely, if it goes astray; instill into its blank pages your own maturer wisdom. Then if Baby No. 1 brightens and helps your school work and turns out to be a good office assistant by and by, the publishers will be glad, and hurry the rest of the infant series into the world.

NEW YORK, October 1, 1902.

Preface to Second Edition

IN the present edition several changes have been made, mainly in the way of additions to the text. A number of typographical errors have been corrected, and an attempt made to change a few sentences whose clearness seem somewhat sacrificed for brevity.

Some notable changes have been made in the section on milk modification, especially the change to seven and ten percent. milk from the original Chapin formulæ; this that the work may agree with the teaching of Professor L. Emmett Holt.

The index has also been revised and enlarged to make it of more service in hasty reference.

The ready acceptance of the first edition, and the many kind words in its praise have been greatly appreciated by

THE PUBLISHERS.

NEW YORK, October 1, 1904.

Synopsis of Obstetrics

ANATOMY OF INTERNAL GENITALIA.

GRAAFIAN FOLLICLE.—A section through the ovary, including a Graafian follicle, shows, in order from without inward—

- Germinal epithelium, Tunica albuginea } Peripheral tunic of ovary.
- Medulla, containing
- Tunica fibrosa, Tunica media, Tunica interna } Tunica propria { Theca folliculi, or tunica vasculosa
- Membrana propria of Waldeyer
- Membrana granulosa
- Liquor folliculi
- Cells of discus proligerus, Corona radiata, Zona radiata, or pellucida { Cells of discus proligerus, or germinal hill
- Perivitelline space
- Clear outer zone, Protoplasmic zone, Deutoplasmic zone } Vitellus (yolk)
- Germinal vesicle (nucleus)
- Germinal spot (nucleolus)

{ Ovum proper

} Graafian follicle and contents.

OVARIES.—Two almond-shaped bodies, depending from posterior surface of broad ligament, attached at hilum to its anterior layer and protruding through its posterior layer.

Diameters.—1.5 cm. thick; 2 cm. broad; 3.5 cm. long.

Borders.—Upper straight border; lower curved border; outer rounded edge or border; inner drawn-out edge or border, running into utero-ovarian ligament.

Surfaces are either upper and lower, or anterior and posterior respectively.

Parenchyma.—One outer, less vascular, zone. Two inner, more vascular zones; outer one contains Graafian follicles, formed from large primordial cells which are developed in the germinal epithelium, and by indenture of "genital ridge" they enter the parenchyma and become detached. This indenture is called "egg column," "Pfluger's plug," or "egg tube."

Maturation of Ovum.—The nucleus approaches periphery (karyokinesis,) loses its membrane, becomes spindle-shaped with a nuclear spindle and fine radiating lines in the protoplasm It then assumes a dumb-bell formation (two star-shaped figures —the amphiaster stage), and one portion, the polar body, is extruded from the surface and disappears. The remainder of nucleus recedes into center of cell and another portion is extended and extruded, the one-fourth remaining being the female element of the cell. The discarded portions are the male element, this being Nature's method of preventing parthenogenesis.

Method of Migration of Ovum.—After its escape from the ovary the ovum is carried along by currents formed in peritoneal fluid by motion of cilia lining the tubes. It may either escape through the tube, or migrate to other regions of abdominal cavity and undergo absorption.

Fallopian Tubes, or "oviducts," are two tubular structures of varying diameter, extending from cornua of uterus outward and upward, then downward and backward to end in fimbriated extremities at the ovaries.

Length.—10 to 12 cm.; divided into four portions. 1. Interstitial portion, extending through wall of uterus. 2. Isthmus, the narrowest part. 3. Convoluted portion (ampulla), comprising about two-thirds of its length. 4. Fimbriated extremity.

Lumen increases in size from without in, except at fimbriated extremity where it slightly narrows; average, 2 to 4 mm.

Peritoneal Covering.—The tube is closely invested in peritoneum except a narrow line along base at attachment of broad ligament, and at fimbriated extremity (osteum abdominale).

Muscular Coats.—Outer longitudinal layer (scant); inner circular layer (well defined).

Mucous Membrane.—Simple, columnar, ciliated epithelium, with wave motion toward uterus. The longitudinal folds of lining membrane are continuous with the fimbriæ.

Corpus Luteum.—After rupture of Graafian follicle and escape of contents the cavity fills with blood from the torn vessels in its walls. A clot forms, and the wall of the sac (membrana granulosa) becomes greatly thickened and is thrown

into folds. Spindle and larger cells develop, enclosing and absorbing clot which becomes pink or yellow. The only difference between the "true" and "false" is in development. Both are formed from blood clot.

Corpus Luteum of Menstruation (*False*), reaches its highest development in ten to thirty days (two weeks). A week later it has almost entirely disappeared, leaving only a small depression in surface of ovary.

Corpus Luteum of Pregnancy (*True*), develops four months and becomes a cicatrix three months after parturition. It is always difficult to distinguish the false from the true, as the former may be overdeveloped and the latter undeveloped.

UTERUS.—A hollow, pear-shaped muscular organ, apex down, somewhat anteflexed, and normally resting entirely below brim of pelvis. The fundus is directed upward and slightly forward and is movable with respiration and distention of bladder. Anterior surface is nearly flat; base and posterior surface are convex. Middle of uterine wall is constricted (isthmus), dividing uterus into body and cervix. Cervix is divided into supravaginal and infravaginal portions—above and below attachment of vagina.

Measurements of adult virgin uterus.—Length, 7.5 cm.; breadth, 4 cm.; thickness, 2.5 cm. "One-two-three inches."

Cavity of body is triangular with base up, flattened anteroposteriorly. The sides are convex. Cavity of cervix is tubular or fusiform. The two cavities are separated by the "internal os," the vaginal opening being the "external os." The latter is the larger.

Peritoneal Coat.—The peritoneum is reflected from the bladder to the isthmus, over the fundus and down posterior wall to attachment of vagina; continuing down posterior wall of vagina for one inch, it is reflected upward over the rectum and sacrum, forming "cul-de-sac of Douglas," "recto-uterine" or "utero-sacral pouch." The "utero-vesicle pouch" is situated between bladder and uterus.

Muscular Coats.—The different layers are difficult to distinguish in the non-pregnant uterus. As shown in the pregnant uterus they are: External coat, thin and closely connected with peritoneum; it is made up of longitudinal and circular fibres, the

former predominating. Middle coat is the thickest, and by its contraction controls hemorrhage; the fibres run in all directions around the vessels, thus acting as sphincters. Internal, a thin coat, composed of longitudinal and circular fibres; the circular predominate, especially around the internal os. The cervix has a relatively small amount of muscle tissue, but derives some from all three layers of uterus; it is composed mainly of connective tissue.

Mucous Membrane of Uterus.—Smooth, and closely connected with internal muscular layer. Covered by simple, columnar, ciliated epithelium, with wave motion toward os. Richly supplied with tubular glands (utricular), their inner third being straight, middle third crooked, and terminals forked and abutting on muscular layer, penetrating the muscle only in carcinomata. Glands are lined by same ciliated epithelium as lines the uterine cavity.

Mucous Membrane of Cervix is irregular and thrown into ridges. Longitudinal folds exist on the anterior and posterior walls, and from these extend transverse folds, thus forming the "plicæ palmatæ," or "arbor vitæ." The longitudinal folds are somewhat spirally arranged, this tending to lock them when in contact. Epithelium in upper two-thirds is ciliated columnar; in lower third is stratified squamous, similar to vaginal portion of cervix. The glands in upper part are similar to utricular; there are also present racemose glands which secrete a glairy, alkaline mucus, this forming a plug in cervix during pregnancy. By occlusion these racemose glands form retention cysts (Nabothian follicles).

Uterine Ligaments.—The uterus is supported mainly by the pelvic floor and ligaments extending from its musculo-fibrous parts. There are six ligaments arranged in three pairs:

Round Ligaments, or "ligamentum teres," extend from cornua of uterus obliquely down and forward, entering inguinal canal and dividing at external ring into three portions—one is attached in canal, one at spine of pubes and one is lost in labium majus.

Broad Ligaments divide uterus into equal parts, anterior and posterior. Round ligament makes a ridge on its anterior surface, the tube makes a ridge in its center. A short posterior ridge

is formed by "utero-ovarian ligament" (ligamentum transverso-colli). A portion between fimbriated extremity of tube and pelvic wall is "infundibulo-pelvic ligament." The ovary is attached to its posterior surface, its pedicle being the "suspensory ligament of ovary." The "fimbria ovarica," or "tubo-ovarian ligament," is a fimbria extending to ovary.

Contents of broad ligament are, the ligaments forming ridges; blood and lymph vessels (more important); parovarium, or ducts of Rosenmuller, formed from Wolffian duct and body which are developed from external ridge in embryo and become epididymis in male; Gartner's duct, the horizontal tube of parovarium, which, by occlusion, forms cysts.

Utero-Sacral Ligaments, "suspensory ligaments," "tubo-ovarian" and "utero-ovarian," support uterus to second sacral vertebra, keeping cervix back and vagina up. Sometimes called "muscular retractors," as they extend from upper part of cervix and have tendency to throw fundus forward. The "utero-vesicle ligaments" are not of importance; they are folds of peritoneum extending from upper part of cervix to bladder, and contain no muscle fibres.

Vascular Supply of Uterus.—The uterus receives an abundant blood supply which it derives from two main sources:

Uterine Artery, from anterior division of internal iliac. Runs down sides of pelvis, between folds of broad ligament, passing in front of ureter to reach side of uterus, where it sends branches downward. It then arches upward and anastomoses with its fellow by numerous branches which cross anterior and posterior to uterus. At isthmus a large branch forms "circular artery of uterus." At cornu, uterine anastomoses with ovarian artery. It can be felt by finger in lateral fornix, and is much enlarged during pregnancy.

Ovarian Artery arises from abdominal aorta below ilium, passes through folds of broad ligament and runs parallel with tube. Sends branches to tube and ovary and anastomoses with uterine. Supplies a branch to utero-ovarian ligament.

Veins.—In base of broad ligament is a plexus of veins (uterine plexus) corresponding with uterine artery. On the right side this plexus empties into inferior vena cava; on left into left

renal vein. Hence blood has more indirect course on left side and this plexus is more subject to dilatation, as is also noted in varicocele of male which occurs principally on left.

Lymphatics of Uterus, Cervix and Vagina.—From tubes and body of uterus to lumbar glands. From cervix and upper part of vagina to pelvic glands. From lower part of vagina and vulva to inguinal glands. From round ligament to inguinal or lower iliac glands. Lymphatic channels are very abundant under peritoneum covering uterus, surrounding it like lace work. Infection may be easily carried to all parts of pelvis.

Nerve Supply.—Both spinal and sympathetic nerves supply the generative organs. The sympathetic supply is derived from hypogastric plexus, opposite sacrum at division of aorta; and from inferior hypogastric, or pelvic plexuses, which extend from hypogastric down either side of rectum, vagina and bladder, supplying pelvic organs. Along with each leg of this are branches from second, third and fourth sacral. The sympathetic supply is chiefly concerned in sexual processes.

MENSTRUATION.

Occurrence.—At regular intervals during health, except during pregnancy and lactation; beginning at time of puberty and ending at menopause. Marked by local and general symptoms, discharge of blood being most important.

Menstrual Blood differs from ordinary blood. It is alkaline, and has a penetrating odor from admixture of gland substance; mucus, especially from cervix, prevents its clotting.

Source.—Mainly from body of uterus and fundus, the cervix taking little part.

Stages.—The complete menstrual cycle may be divided into three stages and a period of rest covering about twenty-eight days, as follows:

1.	Tumefaction of mucosa	about 5 days
2.	Menstruation proper	about 4 days
3.	Restoration to normal	about 7 days
	Period of rest	12 to 16 days
	Total time of cycle	28 to 32 days

First Stage.—Cells of surface modify, mucosa hypertrophies, becoming thick, soft and dark red. Openings of glands are greatly enlarged and are visible to unaided eye. Capillaries are enlarged.

Second Stage.—Diffusion of blood, by diapedesis, beneath epithelium; this leads to disintegration of epithelium, rupture of capillaries and veins and a pronounced flow from entire inner surface of uterus.

Third Stage.—Escaped blood is partly absorbed but is mainly cast off; tissues are rebuilded, and epithelium arches around openings of glands. Superficial layer of mucosa has been cast off, and restoration takes place by multiplication of cells in deeper layers and glands.

Variation in Flow.—Some cases flow only two days, some a week. The average amount of blood lost is 4 to 6 oz. Napkins should not be changed oftener than four times daily, or twenty napkins during the entire period; a greater number indicates an abnormal flow.

Periodicity.—86 percent. of cases are regular in occurrence; the 28-day type being most common, the 30-day next, 20-day next, and the irregular type being least common of all.

Age.—Ordinarily menstruation marks change from girlhood to womanhood. The age varies with race, Jewish girls menstruating youngest; climate, in warm earlier than in cold; environment, high-tension city life being conducive to early menstruation; inheritance and heredity. Average age, thirteen to fourteen years.

10 yrs.—1.	12 yrs.—27.	14 yrs.—28.	16 yrs.—8.	Cragin.
11 yrs.—5.	13 yrs.—28.	15 yrs.—14.	17 yrs.—9.	

Menopause, or "climacteric," is the physiological cessation of menstruation; occurs as a rule about 45, from 13 to 45 being the average child-bearing period.

Menstruation During Pregnancy.—A monthly discharge may occur until decidua reflexa meets decidua vera, which occurs at fifth month. Thereafter any flow must come from cervix or villi of chorion—it cannot be menstruation. Some women have regular flow during lactation.

Relation of Menstruation to Ovulation.—The prime cause of menstruation is presence of ovaries or ovary capable of producing Graafian follicles. It may go on independently after once started.

Proofs of Independence.—It is not uncommon for woman to become pregnant before she has started to menstruate, though ovulation has taken place. Impregnation may occur during lactation, while menstruation is suspended. An ovary and tube removed seven years after cessation of menstruation showed fresh corpus luteum, hence Graafian follicles (Cragin). Ovaries and tubes have been removed and yet menstruation has proceeded. This is very rare, and usually means that some part of ovary has been left, or that there is a third ovary.

Relation Between the Two.—There is a common area in lumbar cord whose stimulation causes dilatation of blood vessels, rupture of Graafian follicles when ripe, and flow of blood from uterus. Pfluger holds that development of a follicle stimulates a congestion by reflex irritation, with a consequent bloody discharge from uterus.

Time of Ovulation is usually that of beginning of menstrual life. However, menstruation may not begin until after first confinement.

Changes in Body at Puberty.—Beginning of menstruation is coincident with a general rounding out of body; the breasts develop, hair appears on mons veneris, hips broaden and the girl's disposition changes. It is important to impress the mother with the necessity of telling her daughter just what is to occur, that she may not be frightened at its onset. This is the mother's *duty*.

A girl to develop properly at this time must have plenty of *blood*—good food, fresh air, outdoor exercise, etc. It is best for her to lie down for first two days of sickness so uterus may have a chance to fully develop; otherwise it may remain small and anteflexed, resulting in dysmenorrhea and sterility.

Evidences that a girl needs medical attention are pains in back, head, etc., dark eyes, tender breasts, feeling of onset of flow without appearance of blood. Such a girl should be given

plenty of rest, fresh air, good food, etc., and in short be "turned out to grass." It is best to keep girls out of school a few years at time of puberty.

ANATOMY OF EXTERNAL GENITALIA.

VAGINA.—A musculo-membranous slit in the pelvic floor, larger above and smaller at external opening. Surrounded by recto-vesicle fascia. Its anterior wall is 6.5 cm. (2.5 in.) long, the posterior wall about 9 cm. (3.5 in.). Anterior and posterior walls normally lie in contact, a cross-section showing a somewhat H-shape, or }–{. Follows curve of urethra and rectum.

Relations.—In its posterior upper third the vagina is covered with peritoneum, while its posterior middle third is in close connection with rectum; in the lower third they are separated by perineal body. In its anterior upper two-thirds, in close relation with bladder and urethra; in lower third urethra is in close connection, being imbedded fimly in tissue of vaginal wall.

Fornix.—Divided arbitrarily into four portions—anterior, posterior, and right and left lateral. In posterior fornix may be felt rectum and contents; in lateral, by pressure, ovaries may be felt unless woman be fat; in anterior, body of uterus. The posterior fornix is followed by pouch of Douglas for about an inch; at this point peritoneum may be opened for drainage through vagina.

Muscular Coats.—Outer longitudinal and inner circular.

Mucous Membrane.—Covered with stratified, squamous epithelium. A few glands are present in upper portion, being transitions of glands of cervix. Two longitudinal ridges on walls are "anterior and posterior columns of vagina."

Vaginal Secretions, if any, are acid, and come through walls from blood and lymph vessels. Acid reaction of vaginal mucus due to action of bacilli which are normally present.

Integument is continuous with skin outside, and, with hymen and labia, is richly supplied with vessels and nerves.

HYMEN.—A crescentic fold of mucous and fibrous tissue on posterior wall of vaginal entrance. Opening is usually crescentic but may be bi-labial or cleft, septate, annular, cribriform, cordi-

form, crenelated or imperforate. Usually torn during first coitus, but may stretch. Hence its presence is no evidence of chastity, nor is laceration evidence of unchastity, as it may have been ruptured by gynæcologist.

Carunculae Myrtiformes.—Remnants of hymen remaining after laceration during first labor.

Mons Veneris.—Cushion of adipose tissue over pubes, thickly beset with stiff, curled hairs and sebacious and sweat glands. Skin is pigmented after puberty.

Labia Majora.—Cutaneous folds, 7 by 2 by 1 cm., meeting in front under mons at "anterior commissure;" behind at "posterior commissure," or "fourchette." Homologues of scrotum. Covered on outer side by skin, hairs, etc.; on inner side by skin, with a gradual transition into mucous membrane at nymphæ. In normal position of body and with well formed vagina and genitals, majora completely cover and hide minora.

Labia Minora, or "nymphæ," are two mucous or delicate skin folds, starting in front as two folds which embrace clitoris; anterior forming prepuce, posterior, the frænum. These unite at sides of clitoris and extend backward to join majora at junction of posterior and middle thirds. Abundantly supplied with nerves and erectile tissue. They contain no adipose tissue. May become enormously hypertrophied (Hottentot's apron).

Fossa Navicularis.—Space between posterior commissure and hymen.

Vestibule.—Triangular area between clitoris (apex), vagina and nymphæ. Between minora, near base, is meatus urinarius.

Bulbi-Vestibuli, "bulbs of the vestibule," lie underneath vestibule. Two almond, or leech-shaped venous plexuses, uniting in front with veins of clitoris. They are bounded by the nymphæ, clitoris and fourchette, and measure 3 by 1 by .5 cm. Covered by bulbo-cavernosus, whose contraction, during coitus, compresses veins and causes erection.

Clitoris.—Homologue of male penis, is a curved organ, 2 or 3 cm. in length, the glans clitoridis being about size of pea. Is

covered by prepuce, which may be adherent and retain smegma. Richly supplied with nerves and erectile tissue.

Clitoris vs. Penis.—Corpus spongiosum and urethra absent in clitoris; these are represented by bulbs of vestibule. Both have glans, prepuce, frænum, smegma, corpora cavernosa.

URETHRA.—A small vertical slit, the mucous membrane being slightly drawn up about the meatus which can scarcely be seen. It is about 4 cm. (1½ in.) long. Muscular coats, external circular and internal longitudinal.

Skene's Tubules, or ducts, thought to be relics of Wolffian ducts, open just within meatus. They may arrest catheter and harbor gonococci. To pass catheter, clean well and introduce *by sight.*

RECTUM.—Lower part, below peritoneum, of importance to obstetrician. Mucous membrane has both transverse (valves of Houston) and longitudinal folds (columns of Morgagni).

Sphincters.—Internal, an aggregation of involuntary muscles of wall of gut. External, voluntary; of great importance to preserve this intact.

INSEMINATION.

MALE GERM CELL.—Discovered in 1677, by Von Hammen, a student in Leeuwenhoek, Germany. Head, round on side, oval and pointed on edge. Next to head is "middle piece"; then long slender "tail," and filamentous "end piece."

Vitality is marked; they have lived for several days in uterus, and have been found in Fallopian tubes 3½ weeks after copulation. Acid destroys their life, while alkaline is a favorable medium.

Formation.—Seminiferous tubules are lined by several varieties of cells. 1. Sustentacular cells, or Sertoli's columns; large supporting cells. 2. Spermatogenic cells, smaller, and lie between sustentacular cells; they divide several times, forming 3. Mother cells; and these divide into four 4. Daughter cells, or spermatoblasts, whose nuclei form heads of spermatozoa. The spermatic cells, or spermatozoa, are set free in tubules with a small amount of fluid.

Maturation.—In male cell the chromatin is halved and polar bodies thrown off similarly to process in female cell; this is to prevent self-fertilization.

Motion.—Due to vibratory motion of tail, and also rotary motion of 90° about long axis.

Seminal Fluid is mainly secreted by glands along seminal tract. A white, viscid, alkaline fluid with a peculiar odor, containing ciliated cellular elements with motion same as other ciliated cells. Number of cells secreted in a week by average man, over 200,000,000.

Sexual Intercourse, "copulation," or "coitus." Physiological object, to transfer male element to female genitals where it can meet and fertilize female element. Divided into several acts:

Erection of Penis.—Due to relaxation of blood spaces and filling with blood; then constriction of outlet by contraction of muscles. This makes possible entrance of penis into vagina. Probably a reflex act, with center in lumbar cord. May be stimulated from genitals or mentally.

Sexual Orgasm.—Entrance of penis occurs with or without corresponding erection of vulva. Some women do not have erection, hence no sexual orgasm or excitement. The synchronous orgasm of both male and female is most favorable to impregnation.

Ejaculation.—Reflex muscular act, due to rhythmic contractions of seminal vesicles and prostate which force semen into penile urethra, then ejaculated with some force by contraction of penile and anal muscles. No discharge occurs in female as in male; vagina is lubricated by secretion of vulvo-vaginal, or Bartholin's, glands, opening into vagina by slender ducts, ¾ in. long, just back of hymen.

Means of Reception.—Uterus approaches vulva during orgasm with intermittent motion, due to contractions of round ligaments; this motion produces suction and tends to draw semen into uterus. Spermatozoa may also reach uterus by their own motion (even when deposited upon vulva), being impelled onward by acid vaginal mucus, and traveling their own length, 1-500 in., in one second. Once within uterus they easily travel upward, due

to stimulation of cilia by motion of cilia of uterus. Hence male cell is active; female cell is passive, being forced onward by ciliary wave and vermicular motion of tube.

Point of Union of Cells, somewhere in Fallopian tube. One week thought to be time required for ovum to travel from ovary to uterus.

Fertilization of Ovum—the union of chromatin of male cell with chromatin of female cell. When the two cells meet the protoplasm of female cell sends up a projection; the male cell meets this, enters, leaving tail outside, and blends, forming male pronucleus; pronucleus of female cell meets this, each being surrounded by a clear zone with radiating lines. These, combined, form segmentation nucleus, near center of ovum. This cell thus has elements of both father and mother—hence characteristics of both parents in offspring. Impregnation takes place at moment of this union, and from it dates the life of the future embryo, fetus and infant.

DEVELOPMENT OF IMPREGNATED OVUM.

Segmentation.—The impregnated cell first divides into two (blastomeres), then four, etc., forming large and small cells. Small cells increase more rapidly enclosing large cells which form "morula," or "mulberry mass." The two masses of cells are later separated by secretion of fluid, except at one point (embryonal area). As this fluid increases in amount the inner cells become flattened.

Primitive Ectoderm, the outer layer of cells, is a temporary membrane, with the larger cells at first flattened out like a watch glass on its interior.

Primitive Entoderm, the inner layer of cells, divides into two layers; outer one, "true ectoderm," inner layer forming "entoderm." Between these another layer, the "mesoderm," develops, all layers together forming "blastodermic vesicle."

Ectoderm forms: 1. Skin and adnexa (glands of skin, hair, nails, teeth, etc.). 2. Nervous system. 3. Organs of special sense. 4. Epithelium of mouth, nose, ears and anus.

Mesoderm forms: 1. Muscles. 2. Bones. 3. Blood vessels and blood. 4. Spleen. 5. Genito-urinary system and reproductive organs. 6. Connective tissue, and 7. Corium of skin.

Entoderm forms the epithelium of the alimentary and respiratory systems, bladder and urethra (in female), and the liver, pancreas, salivary, thymus and thyroid glands.

Embryonal Structures.—The structures (fetal appendages, etc.) springing directly from the ovum, are:

Germinal Area.—Marks site of embryonal formation. It is characterized by color: "area pellucida" in center, surrounded by "area opaqua." This overlies developing embryo.

Primitive Streak.—First indication of embryo. This becomes deepened into "primitive groove," on posterior surface. Lies in direction of long axis of spinal cord; is not permanent, but is remains of some lower order of life.

Medullary Groove.—Forms, at second week, in front of primitive streak; is bounded laterally by "medullary folds," which diverge posteriorly and include primitive streak. Folds unite and form "medullary, or neural, canal," uniting first at cephalic end. Canal remains as second and fourth ventricles of brain and passages between them, and central canal of cord.

Notochord, or "chorda dorsalis," is formed similarly to neural canal by an infolding of entoderm. This is first indication of spinal column, and remains as center of vertebral bodies.

Somatopleure.—The mesoderm is divided longitudinally by infoldings of neural canal and notochord; the two portions become split, the outer layer uniting with ectoderm to form somatopleure.

Splanchnopleure.—The inner layer of mesoderm united with entoderm. The somatopleure first arches over in front, encloses splanchnopleure and forms skeleton. Splanchnopleure forms alimentary canal, bladder, etc. Space between forms peritoneal cavity, pleuræ, etc.

Amniotic Folds.—Folds of somatopleure which surround back of fetus. They appear about the eighth day in the chick, and were developed in the earliest human ovum found. As these folds rise, the fetus sinks into interior of protoplasm. The folds then fuse together behind and thus form two distinct spaces, "true and false amniotic sacs." The inner sac then secretes "amniotic fluid,"

and as it distends the two sides approximate in front of fetus, reducing fetal attachment to narrow "umbilical stalk." The amnion is a thin, tough and elastic membrane, its inner layer formed of endothelial cells, the outer of fibrous tissue.

False Amnion.—Outer layer of somatopleure after union of amniotic cells. Forms chorion.

True Amnion.—Inner layer of somatopleure surrounding fetus. Contains amniotic fluid.

Amniotic Fluid, "liquor amnii," is not a true secretion of amnion, but is filtered through from uterus. Average sp. gr., 1007; maximum amount, about 1 to 1.5 kg. (2.2 to 3.3 lbs.), at middle of pregnancy, less in early and late stages. It is a white, opalescent, alkaline fluid, 99 percent. water, and contains inorganic salts, albumin, urea and virnix caseosa (excretion from skin). A green color means that child is asphyxiated, while the presence of blood indicates the rupture of vessels. Its physiological functions are several: 1. Furnishes moisture to fetus. 2. Maintains constant temperature. 3. Protects fetus from trauma, etc. 4. Nutrition for fetus (?). 5. Allows freedom of motion. 6. In labor, acts as a fluid wedge; nothing equals this as a cervical dilator.

Chorion.—False amnion after it has received vascular supply. Equator of ovum is surrounded by a fringe of villi; these are at first formed only of ectoderm, in some are projections of mesoderm. The villi develop and spread all over ovum, but most of them soon atrophy; those reached by allantois and supplied by blood go on developing, all others atrophy and disappear leaving a part of surface of ovum smooth (chorion læve). The permanent fringe (chorion frondosum) is attached to decidua serotina, and aids in formation of the placenta.

Allantois.—A projection of entoderm, surrounded by mesoderm, which pushes out between true amnion and umbilical vesicle. It carries blood vessels to inside of false amnion to form placenta. Lower part forms bladder and upper part forms urachus.

Maternal Structures.—The maternal structures contributing to the formation of the fetal appendages are developed from the lining membrane of the uterus.

Decidua of Menstruation.—The "decidua menstrualis" is a thick uterine lining which is cast off during menstruation.

Decidua of Pregnancy.—After impregnated ovum lodges in uterus the dicidua of menstruation develops and is not cast off. It is named according to its relation to ovum:

Decidua Vera.—The lining of uterus before lodgment of ovum.

Decidua Serotina.—That portion to which chorion frondosum is attached, and aiding in formation of placenta.

Decidua Reflexa.—That part reflected over ovum. As it develops it approaches decidua vera of opposite side; after fifth month it touches vera of opposite wall, atrophies from compression at point of contact and unites with vera, thus shutting off cavity of uterus.

Placenta.—Formed from both fetal and maternal structures; dates from third month. Large vascular spaces are formed in decidua serotina and into them extend villi of chorion carrying loops of capillaries. There is a gradual atrophy of decidual and chorional epithelium until the villous loops are bathed directly in lacunæ of maternal blood. The average diameter is 18 cm., thickness 2 cm., and weight 16 to 18 ounces.

Shape.—The placenta is a disc-shaped organ, and usually circular; it may be irregular in shape (crescentic, oval, or horseshoe) and number (duplex, tripartita, multiloba, or one or more small accessory placentæ, "placentæ succenturiatæ"). The cord is generally attached to center of fetal surface, but may be eccentric or even outside in membranes (velamentous attachment).

Maternal Surface, next to uterus, is generally smooth and velvety; covered by membrane which divides surface, by crypts, into "cotyledons." It is beefy in character.

Fetal Surface, "amniotic surface," covered by amnion, is smooth and gray. Veins and arteries stand out prominently, the arteries being smaller and more superficial.

Placental Circulation.—The blood vessels of the placenta enter from the cord, divide, dip down below the surface and then form several terraces; this allows long axis of vessels to be parallel with the course of maternal blood, thus favoring osmosis. These vessels divide extensively, and at their termination dip

down into villi and end in veins. The villi project into blood spaces, or lakes, of maternal structures formed by absorption of tissues—the epithelium of endometrium is first absorbed, then endothelium of the walls of blood spaces, and maternal blood directly surrounds villi. Perhaps epithelium of villi also disappears, leaving only vessel walls between fetal and maternal blood. Hence blood from divided cord does not come from mother, but is fetal blood retained in the placenta. The "circular sinus," at circumference of placenta, is not a continuous vessel, but a space largely devoid of villi.

Bag of Waters.—The liquor amnii is contained in a thin, membranous bag (membranes, caul) composed of the amnion, chorion and decidua. Decidua is fleshy and not transparent; amnion and chorion are very thin and transparent and are easily separated. The amnion lines inner surface of placenta and goes off at edges on to uterus; external to it is chorion; then decidua, which is thick over whole of uterus except at site of placenta. The placenta is chiefly composed of chorion and villi; some villi are attached to decidua.

Umbilical Cord.—Formed from umbilical stalk and sometimes remains of umbilical vesicle. It is not surrounded by amnion, but is closed in by somatopleure which grows out toward placenta, pushing amnion before it. Made up largely of "Wharton's jelly" (embryonal tissue); contains no nerves, lymphatics or nutrient vessels beyond a short distance from fetus. For 1 cm. from umbilicus cord is covered with skin. Tissue of cord is all derived from somatopleure.

Blood Vessels.—At first the cord carries two arteries and two veins; later, one vein disappears; all are supplied with valves.

Twists are generally from left to right, looking from fetus. They are not due to turning of fetus in utero, but to unequal development of vessels; the vessels grow faster than cord, hence become tortuous. The torsion may be exaggerated.

Measurements.—At term the cord is about 0.9 to 1.3 cm. (⅓ to ½ in.) in diameter, and about 50.8 cm. (20 in.) in length; the normal strength being such as to break impact of infant with ground, should the birth take place in standing position; the

tearing of cord from fall serving to close lumena of vessels and prevent hemorrhage.

DEVELOPMENT OF EMBRYO AND FETUS.

HEART.—First evidence of embryonal heart is the formation of two parallel tubes running longitudinally in fetal body; these unite and form one tube at end of first month. This single tube makes a U-shape bend and its walls thicken. The auricles then develop, later the valves, and then division into right and left chambers. At end of first month the heart is represented by a projection on chest wall.

INTERNAL GENITALS.—The "Wolffian ducts" appear on each side as a long rod in the outer of two folds on the posterior wall of abdominal cavity; these later become tubular. From the top end of these ducts shorter rods develop at right angles into "Wolffian tubules." Below, the ducts open into the "cloaca." Behind, and parallel to these, two other rods form, which later develop into tubes (Muller's ducts). The "sexual glands" are developed from the inner of the two ridges; ovaries (or testicles) are formed from these. From Wolffian duct and body, in male, are formed vas deferens and vassa efferentia; Muller's duct being unimportant. From Muller's ducts, in female, are developed Fallopian tubes, uterus and vagina; the Wolffian duct remaining unimportant.

DEVELOPMENT OF INTERNAL GENITALIA.

Germinal epithelium and stroma	Male	—Testicle.
	Female	—Ovary.
Wolffian duct	Male	Vassa efferentia. Vas deferens.
	Female	Ducts of Gartner. Paroophoron
Wolffian body	Male	Epididymis (from upper part). Paradidymis (organ of Giraldes). Vas abarans.
	Female	Parovarium. Organ of Rosenmuller.
Muller's duct	Male	Uterus masculinus (sinus pocularis). Hydatid of Morgagni (sessile hydatid).
	Female	Tubes (oviducts). Uterus. Vagina.

External Genitals.—The external organs remain indifferent up to ninth or tenth week—a common external opening (the cloaca), with urinary passages and alimentary canal opening into it, up to sixth week. Anterior to cloaca is "genital tubercle"; behind it is "genital groove," and at each side are two folds, "genital folds," or "labia." At end of sixth week the groove is separated into genito-urinary passage and rectum by growing downward of perineum.

DEVELOPMENT OF EXTERNAL GENITALIA.

Genital eminence	Male	—Penis.
	Female	—Clitoris.
Genital ridge	Male	—Scrotum.
	Female	—Labia majora.
Genital folds	Male	Spongy body. Skin of penis.
	Female	Nymphæ. Bulbs of vestibule.
Urogenital sinus	Male	Prostatic urethra. Membranous urethra. Prostate gland. Cowper's glands.
	Female	Urethra. Bartholin's glands. Vulvar orifice.

Development in Male.—After tenth week genital tubercle lengthens, the inner labia fuse, and together they form penile urethra and pendulous portion of penis. The outer folds fuse and form scrotum.

Development in Female.—There is very little change from the indifferent condition. A septum forms between genito-urinary opening and rectum (perineum). The folds enlarge, forming labia majora and minora. Genital tubercle, with general development, forms clitoris. Genital groove forms vestibule and lower end of vagina. These changes occur about third month, and sexes can than be differentiated.

Character of Embryo at End of Various Months.—Of practical value in determining date of impregnation from nature of cast-off ovum, and to explain nature of deformities, etc.

First Month.—Allantois is developed, and late in month is attached to chorion; umbilical vesicle is greatly shrunken toward end of month. Overlapping of caudal and cephalic ends has

begun to unbend; cephalic bend and neck bend are marked; buds of arms better developed than those of legs (important). Development of visceral arches has begun.

Second Month.—Divisions beginning in buds of arms and legs (digits); better marked in arms. Elbows are flexed and arms held up. Feet turned in. Further unbending of body.

Third Month.—(Common period of abortion). Placenta is formed. External generative organs distinct. Arms held toward face. Soles still turned in. Evidences of human fetus.

Fourth Month.—Generative organs well developed and distinct; sex determined. Eyelids, mouth and lips forming.

Fifth Month.—Finger nails well developed. Fetal movements felt. Liver secreting bile. Face wrinkled and looks senile.

Sixth Month.—Vernix caseosa beginning to be deposited. Eyebrows and eyelashes beginning to grow.

Seventh Month.—Child, if born, often viable. Nails nearly reach tips of fingers. Testicles to, or within canals. Eyelids open. Some hair on scalp.

Eighth Month.—More hair on scalp. Nails better developed. Lanugo diminished. Fetus better developed all around.

Ninth Month.—(Term). All evidences of a mature baby. Nails long. Testicles descended. Lanugo gone. Labia majora in contact. Hair long and pigmented. Umbilicus in middle of body. (Genitals, nails and open eyes are the most important guides as to age of fetus.)

Length of Fetus.—Haase's rule: Square of month, up to, and including, fifth month, gives length in centimeters; after fifth month, multiply by 5. Average length at term, 50 cm.

Weight of Baby.—Depends on factors in mother. 1. Her age; the weights of babies increase up to thirty-fifth year. 2. Her weight and size (also size of father). Average weight at term, 7 lbs. for female, 7½ lbs. for male. Largest at Sloane Maternity, in 11,000 cases, 12 lbs.; 10 lbs. not common.

Fetal Circulation.—During intra-uterine life a large amount of arterial blood is supplied to head; hence relatively large size of head and upper extremities. With division of cord

the placental circulation is obliterated, the lungs expand, and the pulmonary circulation is established with a consequent obliteration of the fetal structures.

Ductus Venosus disappears in three or four days, and becomes impervious in a week after birth.

Hypogastric Arteries.—Their umbilical ends become impervious in a week after birth.

Foramen Ovale may persist pervious for a month; it may be two or three months before permanent closure occurs. If the balancing of hemic pressures in right and left hearts fails to allow closure of valve of foramen ovale, sudden embarrassment of breathing and a lowering of temperature occurs, resulting in cyanosis (blue babies). This may result from foramen not remaining closed, or from its never having been closed. (Lack of development of lungs also causes blue babies.)

Ductus Arteriosus closes in first week and is obliterated in third week after birth.

Nutrition of Fetus.—Liquor amnii is 99 percent. water, hence cannot be of any importance as a supply of nutriment. Most of nutrition, salts, etc., comes through placenta, by osmosis, from maternal blood.

Source of Oxygen, from maternal blood by osmosis. Proofs: 1. In sheep, shown to be more O_2 in umbilical vein than in arteries. 2. Constriction of cord causes asphyxia. 3. Fetus makes no effort to breate until placenta is separated.

Fetal Skull.—At term the fetal skull is divided into cranium and face.

Base.—The incompressible portion; composed of petrous portion of temporals, basilar portion of occipital, sphenoidals, ethmoidals, and orbital portion of maxillæ.

Vault.—The compressible portion; composed of squamous portion of temporals, occipitals, frontals. Spaces between bones are filled by yielding bands of fibrous tissue.

Fontanelles.—Fibrous spaces where three or more bones meet. Posterior (smaller), has three points; should normally be felt presenting. Anterior (larger), has four angles. A third (pair), not always present, may exist behind the ear (lateral fontanelles).

Sutures.—"Frontal," "coronal," "sagittal" and "lambdoidal." Supernumerary sutures may exist.

CHANGES IN BODY DURING PREGNANCY.

Virgin Breasts.—In the virgin the breasts are nearly hemispherical, with nipples at the apeces; in a woman who has borne children the breasts are pendulous. An early symptom of pregnancy, especially in primiparæ, is enlargement of veins over breasts.

Nipples.—Covered by tough, pigmented skin, with no hairs, sweat or sebaceous glands. Contain many sensation papillæ and openings of gland ducts.

Areola.—A tender, pigmented area around nipple, containing hairs and sweat glands. Both nipple and areola have circular and longitudinal muscle fibres, whose action is to cause a projection of the nipple by a sort of erection.

Glands.—The breasts may be regarded as highly specialized sebaceous glands. Each mamma is made of fifteen to twenty lobes, which consists of lobules and these again of alveoli. When the glands are stimulated to action by pregnancy the lobulations can be felt.

Ducts.—Each lobe empties by a "lactiferous duct" upon surface of nipple; these may open on areola. The ducts are fifteen to twenty in number, corresponding to number of lobes; they enlarge at "ampullæ," near nipple, and are again constricted at external orifices.

Secretion.—Fluid may be present in the nipples of a non-pregnant woman; it may result from tumors of uterus, menstruation, etc. "Colostrum corpuscles" consist of broken down epithelial cells containing fat globules; are numerous at beginning and absent later. After a short time the droplets are set free and form milk. Colostrum is Nature's laxative.

Uterus.—All organs of body undergo changes in sympathy with developing uterus; also disposition, etc., changes. At third month the uterus is pyriform; at fifth month it is more globular, and from fifth month on, enlargement is mainly in an upward direction.

Broad Ligaments become shortened with growth of uterus. Ovaries approach nearer to uterus.

Muscles of Uterus are all hypertrophied and hyperplastic; all fibres are greatly enlarged.

Endometrium.—Menstrual tumefaction period is continued. Lining membrane becomes divided into the different deciduæ.

Peritoneal Covering becomes greatly hypertrophied to keep pace with growth of uterus.

Vessels are all greatly enlarged and are still tortuous. The uterine artery may be felt pulsating in lateral fornix.

Nerves are increased, especially by a development of a neurolemma; there is some new development of nerve-tissue.

Lymphatics.—Greatly enlarged; hence pregnant woman is much more susceptible to infection than nullipara.

Growth.—Enlargement of uterus begins in lower part of body and extends chiefly laterally. In first few months uterus sinks in pelvis; in later months antero-posterior enlargement makes uterus appear flattened from side to side. Up to fifth month the enlargement is due mainly to growth of uterus, whether fetus be present or not; after fifth month enlargement is due to both growth and distention. Growth of uterus causes various pressure symptoms in pelvis—frequent urination, due to pressure on bladder; venous distention of limbs, and varicose veins of legs and vulva.

Position of Fundus at Various Months.—At fourth month the fundus is just above symphysis; at fifth month, midway between symphysis and umbilicus; at sixth month, on level with umbilicus; at seventh month, one-third distance between umbilicus and ensiform; at eighth month, two-thirds distance between umbilicus and ensiform; at eight and a half months the fundus has reached ensiform, and later it sinks somewhat.

Cervix.—Little increase in cervical tissue; there is a separation of fibres and increase in fluid, hence softening. At fourth month lips of cervix are softened, and later whole cervix is softened. The cervix appears shorter, due to softness and the lessening of space in fornices from thickening of vaginal walls. In last fortnight cervix is actually shortened due to contraction of logitudinal fibres, drawing it up into lower uterine segment.

Vagina.—Vessels are increased, mucosa softened and ridges obliterated. It has a violet hue, due to venous congestion.

Vulva.—Enlarged, due to softening and thickening. Vessels are congested; glands are increased, with increased discharge; veins are enlarged.

Abdominal Wall.—Distention of abdomen causes separation of fibres, resulting in formation of "brownish or bluish striæ" in skin; seen especially in flank. After labor these become white (silvery striæ), from formation of scar tissue. In multiparæ both silvery and brown-blue striæ are present at same time.

SIGNS AND SYMPTOMS OF PREGNANCY.

Breasts.—Symptoms begin at third month. Breasts become enlarged and firm.

Areolae thicken, broaden and darken. Montgomery's glands enlarge. At sixth month a mottled band appears around the primary areola (secondary areola); pigmentation is most marked in brunette, least in blonde. Montgomery's tubules are more prominent in blonde.

Nipples.—On stimulating the nipples they become elevated and corrugated, due to action of circular muscles.

Vessels.—There is an increase in vascularity; the veins are markedly enlarged and prominent. Occurs from third month on to term.

Fluid in Breast.—Ordinarily after third month a little fluid, mainly colostrum, can be expressed. Not a positive sign; it may occur in case of abdominal cysts, etc., or for several years after confinement.

Pigmentation is increased in almost all surfaces, especially in linea alba, breasts, face and eyes, and vulva. Linea alba becomes "linea nigra." Cicatrices in abdomen become pigmented. Pigmentation follows cicatrices from the normally pigmented areas, hence in incising breast avoid extending incision from areola to white skin outside. There is generally pigmentation of entire skin surface, especially on forehead, cheeks, nose, etc.; this remains until after confinement.

Abdomen.—There is gradual enlargement of abdomen from growth of uterus. Its shape depends on position of fetus, which may be on either side, or above or below.

Striae.—Due to rupture and separation of deeper structures, thus stretching skin. This is due merely to distention of abdomen, hence may occur with tumors, or ascites, in both males and females. They are not confined to abdomen but may occur on thighs, from œdema, etc.; on flanks—most commonly occur here; may also occur on breasts. New striæ are reddish. Old striæ are silvery white (cicatrices); these may begin to form in latter part of same pregnancy.

Fetal Movements.—On palpation and inspection, abdomen is found to alter in shape, due to active motion of fetus.

Uterine Sounds, heard with aid of stethoscope, are among the positive signs of pregnancy.

Fetal Heart Sounds.—Heard by placing the stethoscope on abdominal wall over back of fetus. Heard as early as fifth month, but may not always be audible. Fetal heart beats at rate of 120 to 160 per minute, like faint ticking of watch.

Uterine Souffle is synchronous with maternal heart beat. Is not positive. Caused by some pressure on uterine artery.

Umbilical Bruit.—Synchronous with fetal heart-beat. Caused by obstruction to funic arteries. Positive, but rarely heard.

Vulva and Vagina.—The bluish, violet color is good evidence of pregnancy.

General Symptoms.—Constipation, and pains in thighs and lower part of abdomen are results of pressure in pelvis.

Blood.—Pregnant women were formerly supposed to be plethoric, and bleeding was practiced. As a matter of fact, there is an excess of white cells, fluid and excrementitious matter, with a diminution in red cells and albumin.

Heart is increased in size and force, due to increased work performed. Numerous pregnancies result in a permanent enlargement of heart. Palpitation is common, due to pressure on heart by change in thorax.

Nervous System.—Balance of control is very hard to maintain. Disposition is generally upset, hence make allowances in preg-

nancy. Surround woman with all the pleasing things possible, for good of both mother and child.

Liver and Spleen.—Commonly enlarged. Resolution results in fatty degeneration.

Thyroid becomes enlarged if woman has any tendency to goitre. Repeated pregnancies cause permanent enlargement.

Respiration.—Mother breathes for two, hence respiration is increased. Fainting is frequent in crowded halls, etc.

Digestion.—Mother digests for two; hence the appetite is increased, and digestion is often upset, due also to congested stomach.

Gait of Woman.—Shoulders and head thrown back. Skirt is shorter in front, due to enlargement of abdomen and to throwing backward of shoulders.

Urine.—Watery element and chlorides increased; phosphates and sulphides decreased. Amount of urine is increased but specific gravity is decreased. Urea remains normal. There should be no albumin.

DIAGNOSTIC SIGNS OF PREGNANCY.

During First Three Months.

SUBJECTIVE.	OBJECTIVE.
Cessation of menstruation.	Softening of cervix.
Morning sickness.	Hegar's sign.
Bladder symptoms.	Violet color of { Vulva. Vagina. Cervix.
Salivation.	Mammary changes.
Toothache.	Flattened abdomen.

During Last Six Months.

Fetal movements (quickening). (May also be objective.)	Increase in size of abdomen.
	Ballottement (positive).
	Fetal movements (positive).
	Uterine Souffle.
	Fetal heart sounds (positive).
	Umbilical Souffle.
	Intermittent uterine contractions.

Signs of Pregnancy During First Three Months.—These

are symptoms before formation of placenta. None of them are positive of pregnancy.

Cessation of Menstruation.—May be due to other causes, as phthisis, etc. Dread of pregnancy may cause amenorrhea until fears are relieved; this is most marked in unmarried girls. On the other hand, women may menstruate during pregnancy up to the third month. General rule: In married women between fifteen and forty-five years of age, cessation of menstruation means pregnancy. Ascertain if insemination occurred after or before last menstruation.

Morning Sickness.—Occurs in about 50 percent. of cases, and may start immediately after impregnation. Generally occurs just after rising; with some women just after breakfast. Sometimes induced by brushing teeth. In early morning, vomitus is a thin, glairy mucus. In first three months, cause is purely reflex; but in later months it may mean an entirely different thing, e. g., toxemia due to kidney deficiency. Usually does not begin till after sixth week, and does not continue after fourth month.

Bladder Symptoms.—Frequent urination is due to pressure on the bladder from enlarged uterus.

Salivation.—Commences after nausea, and generally persists after nausea stops. Said to be due to change in mucus secretion.

Toothache.—Probably due to an absorption of earthy phosphates from tissues of mother (Brunton). Give phosphate of lime with meals.

Softening of Cervix.—Cervix is broader and softer, lying near thickened walls of vagina; hence it appears shorter. The softening is due to pronounced congestion and increased vascularity; hence anything producing marked congestion will cause softening and violet hue. It may be caused by a metritis set up by a dirty sound, etc.

Hegar's Sign.—The compressibility of lower uterine segment as distinguished from upper segment. In first three months uterus is pyriform; later it is a sphere-on-cylinder, due to softening and thinning of lower segment, and thickening and hardening of upper segment. Observed about sixth week.

Violet Color of vulva, vagina and cervix from venous congestion. (Chadwick's sign.) Only presumptive evidence.

Mammary Changes.—At end of third month there is presence of colostrum, increase in pigmentation, and the areolæ are enlarged and thickened. At sixth month secondary areolæ are developed. A tumor in pelvis, however, may stimulate flow of colostrum.

Flattened Abdomen.—Due to sinking down of uterus into pelvis from increased weight.

Signs of Pregnancy During Last Six Months.—The symptoms during last six months of pregnancy are more or less positive.

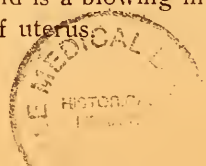
Fetal Movements, "quickening," occurs usually at four and a half months, but may sometimes be felt before. May be simulated by action of intestines or be absent if child is dead. Time of quickening is of value in diagnosis, as in case of a lactating woman becoming pregnant. It is a positive sign when detected by physician, by palpation and inspection. Movements are especially strong after seventh month.

Increase in Size of Abdomen.—The abdomen gradually increases in size as pregnancy advances; the uterus is felt to be pyriform, with small end downward. The uterus is altered in shape with abnormal positions of fetus, multiple pregnancy, or with displacement or tumors of uterus.

Umbilicus.—Up to fifth month umbilicus is depressed below surface; at sixth month it is flush with skin, and at seventh month it pouts.

Ballottement.—A positive sign. It is a feeling of a solid body floating in fluid. External, by abdominal palpation; internal, by vaginal palpation. Child must not be too large, and fluid must be sufficient in amount. It may be confused with—1. Stone in bladder filled with urine; hence have the bladder empty before making examination. 2. Fibroid with a long pedicle.

Uterine Souffle.—It is not a placental souffle, as it may be heard in non-pregnant uterus, as in case of fibroid. It is due to rushing blood through the uterine sinuses, and may be at any location where the sinuses are enlarged. It is synchronous with the mother's heart-beat, and is a blowing murmur, most frequently heard in lower parts of uterus.



Fetal Heart Sounds.—A double sound, the first being more distinct; much more rapid than maternal. Frequency about 120 to 160 per minute, the rate supposed to indicate six: 120 to 130 in male, 140 to 160 in female. ("Make a guess and have another one ready."—*Voorhees.)* It is most often and best heard in the lower uterine segment, through back of fetus. Its location indicates presentation: If heard below umbilicus, head presentation; above umbilicus, breech presentation; if heard best in front, shows back of fetus is to front; if behind in flank, shows back of fetus to be behind; the side upon which it is most distinctly heard corresponds to fetal back. The fetal heart beats more rapidly during labor pains, and slower in intervals between pains. If heart sounds are excessively rapid or slow it indicates danger from pressure on fetus or placenta. Their absence does not exclude existence of pregnancy; may be due to dead fetus, excessive liquor amnii, thick abdominal wall, loud uterine souffle, etc. Beat of maternal aorta has been mistaken for them.

Umbilical Souffle, or "funic souffle," is like a systolic murmur of heart. It is a blowing sound, synchronous with fetal heart-beat, and is a blowing first sound. The cause is not clear, but is probably due to some impediment to circulation in the cord; as from pressure of head on cord or placenta, or from cord being looped around an extremity. It is not of much moment unless it is constant or interferes with fetal heart.

Braxton Hicks' Sign.—Intermittent contractions of uterus. Not a positive sign. Somewhat resembles rhythmical contractions of uterus during labor, but is much less in extent and frequency. It may be caused also by any foreign body in uterus, as a tumor, placenta, membranes, blood clot, etc.

Three Positive Symptoms in last six months are—1. Passive movements of fetus (ballottement). 2. Active movements of fetus. 3. Fetal heart sounds.

Differential Diagnosis of Pregnancy.—The two chief things from which pregnancy must be differentiated are: 1. Sub-involution, or metritis; this is not usually difficult to diagnose. 2. Fibromyomata, which is more difficult to differentiate.

Pregnancy	vs.	Subinvolution, or Metritis.
Amenorrhea.		Menorrhagia.
Uterine body soft.		Uterine body firmer.
Cervix soft.		Cervix may be soft.
Uterus more jug-shape.		Uterus less jug-shape.

Pregnancy	vs.	Fibromyomata.
Rapid growth.		Slow growth.
More symmetrical.		More nodular.
Amenorrhea.		Menorrhagia.
Cervix soft.		Cervix firm.
Positive symptoms present.		Positive symptoms of pregnancy absent.

Tumor Complicating Pregnancy.—If tumor and pregnancy co-exist the problem is more difficult. The enlargement of abdomen is much more rapid than with either pregnancy or tumor alone. Menstruation is stopped if pregnancy exists. A few months' careful watch will usually suffice to make a diagnosis.

Pregnancy	vs.	Ovarian Tumor.
Amenorrhea.		Menstruation continues.
Tumor more central.		Tumor more lateral.
Breast signs present.		Usually absent; rarely present.
Positive symptoms present.		Positive symptoms of pregnancy absent.

Ascites.—Fluctuation is not distinct in pregnancy unless the liquor amnii be great in amount; it is always present in ascites.

Pregnancy	vs.	Ascites.
Fluctuation not distinct.		Fluctuation distinct.
Percussion more dull in front.		Resonant in front.
Amenorrhea.		Menstruation continues.
Positive symptoms present.		Positive symptoms of pregnancy absent.

Pseudocyesis.—"Spurious or false pregnancy." One phase of pseudocyesis occurs about time of menopause when abdominal fat causes the "tumor," and indigestion and intestinal flatulence cause the "labor pains." Another form occurs in hysterical women whose intestines have become distended and paralyzed.

Pregnancy	vs.	Pseudocyesis.
Positive symptoms present.		Positive symptoms absent.
Cervix soft.		Cervix hard.
Uterus enlarged.		Uterus small.
Tumor does not disappear on pressure.		Tumor disappears on steady pressure or under anaesthesia.

Evidences of Fetal Death.—Usually the first evidence of a dead fetus is a subsidence of the symptoms of pregnancy, or a lack of their steady advancement. After a time the woman loses her general health, appetite is poor, she has a sallow complexion and feels generally run down. Temperature may not rise as long as fetus is aseptic. The first symptom may be an effort of uterus to expel fetus. If membranes have been ruptured and the uterine contents infected, the skull bones may be loose and feel like a bag of bones in cervix. A dead fetus may sometimes be carried for years without giving trouble, and, with exception of bones, may become entirely absorbed; or it may become calcified (lithopedion).

Diagnosis and Treatment.—Only safe rule is to "watch and wait." If the temperature does not rise the case is safe. A couple of weeks' watching will show fetal movements if life be present. Many things may interfere with hearing heart sounds; hence make many trials before deciding fetus dead.

Duration of Pregnancy.—Average duration is 280 days, nine calendar months, or ten months of twenty-eight days. The time may be prolonged, but exact date cannot be ascertained with certainty, as the male and female cells may not come together for some days after coitus.

Computation of Time.—Nægele's rule: Take first day of last menstruation, count back three months (or forward nine months), and add seven days. Ascertain if intercourse occurred before or after last menstruation, as time may vary as much as three weeks. Later on the progress of pregnancy may determine date of impregnation (quickening is usually first felt at middle of pregnancy).

MANAGEMENT OF PREGNANCY.

History of Case.—When first called to a case it is important to get a comprehensive history to serve as a basis for subsequent treatment. Ascertain especially if patient is a primipara or multipara, and nature of previous confinements, if any. The following outline will be found convenient:

History Facts.

1. Name.
2. Age.
3. Health before puberty (to ascertain condition of pelvis, whether rachitic or not).
4. Menstrual history (important).
5. Primigravida or multigravida (past experiences tell what may be expected in the future).
6. Condition during previous pregnancy, if any.
7. Character and result of previous confinement.
8. Present existence of infective inflammation (important to ascertain if previously infected, and if so to guard against reinfection).
9. Malaria?

Primigravida	vs.	Multigravida.
Abdominal wall firm and tense.		Abdominal wall lax and wrinkled.
Projecting parts of fetus not as distinct.		Projecting parts of fetus more distinct.
Striæ on abdomen, thighs and nates appear late; color, reddish-brown or slaty.		Besides striæ as in primigravida, there are present shiny, silvery-white striæ.
Breasts feel firm and tense.		Breasts are flabby and pendulous, with silvery striæ.
Labia in apposition.		Vulva gaping; violet color.
Vagina narrow; the transverse ridges are distinct.		Vagina smooth; ridges largely obliterated.
Hymen fissured, but back is frequently attached to introitus.		Carunculæ myrtiformes alone remain as vestiges of hymen.
Os externum closed until late in pregnancy.		Os externum is patulous, and admits finger tip.
Cervical canal spindle-shaped.		Cervical canal conical.
Old lacerations of cervix absent.		Old lacerations of cervix present.

Management of Pregnant Woman.—The patient should be watched very carefully from the time physician is engaged. She

should be cautioned against indiscretions in eating, etc., and a careful watch of urine should be kept. A single case of over-exposure or over-eating may precipitate an attack of eclampsia.

Exercise.—Moderate exercise should be encouraged; violent exercise prohibited. Bicycle riding and golf are debatable. Avoid stair climbing and lifting. The sewing machine is a "labor saving" machine. Dress comfortably for exercise. Walking and riding over smooth roads are the best forms of exercise; stop just short of fatigue in start, gradually increasing distance (walking) up to one or two miles. Continue systematic exercise till a fortnight before labor.

Dress.—Should be loose and made to fit growing body. A corset waist should be worn to support skirts and stockings; no corsets. Avoid garters on account of varicosities.

Food.—There is loss of appetite in beginning; hence take food frequently and in small amounts, such as milk, broth or eggs every six hours. From third to eighth month, appetite is usually good. During last month, patient will be more comfortable if easily digested food is taken frequently and in small amounts. If kidneys are normal, let patient make her own selection of food.

Drink.—Exclude alcohol; it may irritate the kidneys and derange digestion.

Bathing.—Follow ordinary habits. Frequent bathing, either hot or cold, should be allowed if patient is accustomed to it. Avoid shock of cold spray. Well to give one or two warm baths per week to favor elimination from skin.

Sexual Intercourse.—The most frequent cause of miscarriage with young married people. Should not be allowed at all in early months, nor more than twice a week in later months; avoid altogether at time which would be natural menstrual period. During last month, interdict intercourse entirely, to avoid infection of vagina; the vagina is naturally sterile, the penis never is.

Constipation.—The bowels are never active during pregnancy, owing to pressure in pelvis of gravid uterus. Avoid drugs as much as possible; regulate by diet—coarse food, fruit, plenty of water, and regular hours for stools. Two or three glasses of water in morning may cause stool after breakfast; it also favors

elimination through kidneys and skin. Avoid breaking regular habits.

Laxatives.—If drugs must be given to keep bowels open, use cascara sagrada, in tablets (each representing 3 to 5 m. of the fl. ex.); take two or three tablets at night. Or the aloin, belladonna and strychnin compound (A. B. S. pill), in proportion of 1-6, 1-12 and 1-120 gr., is also good. Any laxative mineral water taken in the morning may suffice; also warm water enemata, or gluten or glycerin suppositories may relieve. Use anything to obtain one movement a day.

Care of Urine.—Don't neglect to examine urine at least once a month in first months, and every two weeks in middle of pregnancy; if albumin is present, examine once a week, or even once a day. Test for urea as well as albumin; the amount of urine in twenty-four hours and specific gravity may suffice. Have specimen sent to office on regular days, and insist on having clean bottles and plenty of urine. Make records of findings.

Breasts.—Give plenty of room to develop. Do not allow tight corsets, which drive nipples inward; such nipples must be manipulated in later (not early) months. Have patient anoint nipples at night with albolene (solid or liquid), or cocoa butter, then wash in morning with warm water and a good soap; this softens crust.

PATHOLOGY OF THE PREGNANT WOMAN.

Morning Sickness.—A certain amount of nausea during pregnancy is physiological, but it may easily become abnormal and hence it must be watched; it may become very serious. Ordinary morning sickness is a simple affair; the patient may lose her breakfast, or a slight amount of mucus when brushing teeth.

Causes—Predisposing, excessive excitability of the nervous system; some exciting cause, as misplaced uterus, etc. The nausea and vomiting of later months generally mean toxemia.

Treatment.—Find cause if possible and correct it; look for retroversion, which is most common in multigravidæ, and in girls with lack of development from insufficient care at time of puberty. Some drugs may help, but they generally fail; try cerium oxalate, bismuth subnitrate, sodium bicarbonate, tincture of nux vomica,

carbolic acid, or small doses of cocain; the first four are most commonly used, but they may all fail. If vomiting persists, give a small amount of food before rising in the morning. If all drugs fail, then rest the stomach, and feed by rectum. Nerve sedatives by rectum may relieve—chloral, with or without bromides and opium, or all three may be given with nutrient enemata. Wash rectum daily with salt solution, letting intestine absorb if it will. If pulse becomes rapid and feeble, purpuric spots appear, and the temperature is subnormal or perhaps elevated, don't hesitate to empty uterus and *don't wait too long.*

Feeding per Rectum.—Some patients may be saved by rectal feeding, but don't continue longer than a week, as patient may become too weak for operation.

Subsequent Feeding.—After rectal feeding it is best to begin with matzoon or koumiss, in teaspoonful doses; or milk and lime water, two teaspoonfuls at a time; or milk with 10 gr. each of sodium bicarbonate and cerium oxalate, a few teaspoonfuls at a time. Iced champagne may be retained at start. Best to give some preparation of milk in small amounts at frequent intervals.

Surgical Treatment.—Copeman suggests dilatation of cervix; this may be sufficient without rupturing membranes. The dilatation of a poorly developed cervix may check vomiting without causing emptying of uterus.

Salivation.—A nervous disturbance, commonly occurring with nausea and vomiting. It may be very marked, pints of saliva being secreted daily. There is little that will relieve; atropin may help, but as trouble is nervous, nerve sedatives, bromides, opium, etc., work best. Iron and arsenic are good to tone up general system.

Herpes.—A skin eruption, nervous in origin. Whole surface of body may be affected—arms, legs, face, etc. May develop after labor, but generally before. The itching and discomfort may undermine general health. Borated vaselin, or resorcin ointment may relieve in the first stage; when vesicles are developed, use dry powder, starch or borated powder being good. Carbolic ointment will relieve itching.

Maternal Impressions.—The relation between mental shock and fetal malformations is considered more than coincidence.

Shock seems to disturb circulation of the mother and cause deformity of fetus. Two factors are prominent: 1. Suddenness of shock. 2. Impression of object is usually obtained through sight.

Chorea.—This is one of the most important diseases influenced by pregnancy, and the prognosis depends upon its severity; it is usually well marked. Uterus may be affected the same as voluntary muscles, and if the disease begins early and has a tendency to increase in severity, the prognosis is bad for both mother and child, the mortality being high. Chorea is rare in women over twenty unless pregnancy exist.

Prognosis.—The disease is apt to be followed by mania, paralysis or nervousness; the temperature is usually elevated, and mania may develop during pregnancy or puerperium. Prognosis, for child, is good if the disease develops late in pregnancy. If it comes on early in pregnancy, abortion is usually necessary or spontaneous; it is more apt to occur in primigravidæ, owing to tenseness of abdominal and uterine walls; multiparæ may abort during first attack of the disease.

Treatment consists principally in administration of bromides, arsenic and iron. As the disease usually occurs in illy nourished women, the first indication is to build up the constitution. If the disease does not improve under tonics, then empty the uterus unless near at term, in which case let go to term; it does not usually last long after delivery. The injury to the mother may be permanent.

Diabetes.—A rare disease in pregnancy, and must be distinguished from the glycosuria occurring in pregnancy and lactation. If the sugar and amount of urine steadily increase, accompanied by a loss of flesh, watch the patient carefully. Polyhydramnios usually accompanies the disease, the liquor amnii containing sugar.

Prognosis.—Very bad for both mother and child. Mortality of twenty cases was four percent. of mothers. Mode of death is not that usually seen in non-pregnant; the patients go into collapse and die suddenly. The disease may continue for a long time after birth of child.

Treatment.—In a marked case of diabetes it is best to disregard life of child and empty uterus.

Displacements of Uterus.—The most common is retroversion; in most cases there is some retroversion before pregnancy. It may be due to distention of bladder, falls on back, etc.

Course of Pregnancy depends on whether uterus is fixed or movable. It may correct itself, but the duty of the physician is to correct it.

Signs and Symptoms.—Absence of the body in front, and its presence behind. There is severe constipation, disturbances of bladder, frequent micturition, and constant pains in back from pressure on nerves.

Treatment.—If fundus is movable, put woman on side, or in knee-chest position, and replace. After fourth month it will remain in place. After replacing, support with pessary.

Common Results.—If adhesions are present, fixing fundus firmly under promontory, Nature may stretch them and free uterus; if too firmly adherent, she will empty the uterus.

Uncommon Results.—The uterus goes on developing, cervix is thrown upward, fundus enlarges in pelvis, and the posterior vaginal wall is pressed forward, resulting in "incarcerated uterus." Symptoms are pains in back, and severe bladder symptoms; from distention of bladder, sloughing may occur in bladder walls, resulting in rupture, peritonitis or uremia, and death. Treatment: Attempt to correct at earliest possible moment. If it cannot be corrected per vaginam, open abdomen and correct, and perhaps empty the uterus. It *must* be corrected.

Sacculation of Uterus.—When posterior wall is adherent and uterus remains incarcerated, the anterior wall may enlarge upward. The child may be born through cervix, or Cesarean section may be necessary. Sacculation may also be the result of gynæcology—a ventro-fixation for retroversion, the anterior wall of uterus having been too firmly fixed to abdominal wall. The anterior wall is thickened and forms a fleshy tumor filling vagina; the posterior wall is distended and thinned. This is not the usual result, however, if primary union has occurred after fixation.

Treatment.—Cesarean section is the only solution, as the cervix cannot be liberated. In doing a ventro-fixation, make sutures *below* fundus.

Prolapse of Uterus.—The fetus is usually above pelvis, the cervix being prolapsed. Exposed surface of cervix may be eroded or excoriated.

Treatment.—Put woman in knee-chest position and replace uterus with hands; keep in bed till uterus is firm. Best not pack vagina, but give vaginal douches.

Leukorrhea.—Due to the extra congestion of pelvic organs common in later months. If excessive, treatment is necessary.

Treatment.—There is danger of infection from nozzle or douche, or from force of stream; hence use a small, clean nozzle, and do not raise bag higher than length of woman's arm as she lies on bed. Use borax water—two teaspoonfuls of borax to a quart of water, temperature about 100° to 105° F.

Pruritus Vulvæ.—Depends largely on leukorrhea; also to congestion and lack of cleanliness. Causes are: 1. Constitutional—gouty diathesis, less commonly diabetes. 2. Local—more commonly to uncleanliness. It may be slight, not keeping patient awake; or it may be excessive, reducing the general health.

Treatment.—Find general cause (e. g., urine), and treat it. Locally use: 1. Borax douche, plain; or add ½ teaspoonful zinc sulphate, ½ teaspoonful alum, and 1 teaspoonful borax to a quart of water. 2. Applications of silver nitrate in 2 percent. solution. 3. An ointment containing menthol. 4. Or an ointment containing "resinal" (tar, zinc and stearin).

Varicosities of vulva or extremities are more common in the multipara. Caused by any obstruction to venous return; as corsets, garters, constipation, or retroversion or retroflexion of uterus. Most common in lower limbs, and need treatment. May become inflamed, and may rupture from fall or blow, or straining during labor, forming hematomata.

Treatment.—Put patient to bed and apply ice bag to veins. Relieve pressure of clothing and garters, and examine condition of uterus and bowels. If vein should rupture, let patient lie down and apply clean pressure—a cloth or the thumb; quiet fears of woman.

Œdema of Legs, when not due to kidney trouble, is due to pressure above. Exclude kidneys by examination of urine, and relieve pressure.

Fibroid Tumors of Uterus.—Fibroids are a common complication of pregnancy; however, impregnation is not so apt to occur if tumor is present. The symptoms depend on size and location of tumor.

Submucous Fibroids.—Almost always associated with endometritis; the discharge is a handicap to pregnancy, and miscarriage is likely to occur. A tumor in lower uterine segment may obstruct passage and have to be removed before labor can proceed.

Interstitial or Mural Fibroids.—May be one or a number. Usually accompanied by endometritis, which may handicap pregnancy and induce miscarriage. Braxton Hicks' sign may be present with painful contractions. After labor, postpartum hemorrhage is liable.

Subserous Fibroids.—Trouble caused depends on the size and location of tumor; they may give no trouble and may not be found until fundus is felt during labor. May be numerous, and may cause no pain, especially if they are small, high up and do not press on endometrium. If they are in lower zone of uterus and large, they may obstruct labor.

Management of Obstructed Labor.—Try to push tumor out of way; if impossible, treatment depends on size of tumor. If small, perform version, or forceps may suffice; if larger, craniotomy may be performed, or, if the surroundings warrant, a Cesarean section, as tumor will have to be removed anyway. Uterus may spontaneously retract fibroid and allow normal labor to proceed.

Advice to Pregnant Woman with Obstructed Fibroid.—Always consult wishes of parents when giving advice. The advice in second or third month depends on—1. Whether family are very desirous of having child, and are willing to submit to danger of Cesarean. The mortality is low, hence this advice can well be given, providing the child is alive at term. 2. If patient is not willing to undergo Cesarean, may (a) empty uterus and leave fibroid, which will then cease to grow; or (b) tumor may be so situated that a myomotomy may be done, leaving uterus and perhaps sparing child.

Changes Occurring in Tumor During Pregnancy.—The tumor

may undergo coagulation necrosis in center from impaired circulation and necessitate immediate removal. On the other hand, a fibroid may be cured by pregnancy.

Ovarian Cysts.—Cysts of the ovary or parovarium, in the peritoneum or broad ligament, may obstruct labor. If small (size of English walnut), they may be disregarded until after labor. If large (size of fist), it is best to remove tumor at once and pregnancy may continue; even if miscarriage does occur, action is justified; this applies to either form of cyst.

Obstructed Passage.—If pregnancy is at term and the passage is obstructed, try to—1. Push tumor out of way; if impossible, then—2. Tap, especially if cyst is interligamentous, as the fluid is thin and enucleation is dangerous; it may fill again, but relief is absolute for the time being. Peritoneal cysts may also be tapped. In case of gelatinous or dermoid type, do not tap, as it will do no good and will probably prove dangerous; best to perform laparotomy, removing both tumor and child, as uterine contractions may rupture the stump if child be left.

Cancer of Cervix.—This is a most unfortunate condition; it makes cervical tissue inelastic, and tearing and hemorrhage are inevitable. Life of the child is not to be considered, but remove the disease, if possible, early or late—better in early pregnancy. Even if near full term, the chances of child are very poor, as vitality will be low no matter how delivered; but general rule is to perform Cesarean, at same time removing uterus and cancer if possible. In mild cases of cancer, cervix may dilate normally, and hemorrhage can be controlled by packing. The mortality for child is high, due to low vitality.

Anemia.—During pregnancy the blood is physiologically anemic, having fewer red cells and more watery element; this may become extreme and pathological, in which case it is best to induce abortion, as this is Nature's method of curing. Pernicious anemia should be treated with arsenic, iron, etc., first; hemorrhage may be intense and should be prepared for.

Infectious Diseases.—Owing to increased vascularity during pregnancy infection readily occurs, and the course is worse

and mortality greater. Treat the disease and disregard the pregnancy.

Gonorrhea.—When a virulent discharge is present, with burning during micturition, suspect gonorrhea. Latent gonorrhea may become active during pregnancy.

Dangers on part of mother: Infection may travel up urethra to bladder, or up tubes to peritoneum. On part of child: Ophthalmia neonatorum, from vaginal discharge during labor.

Treatment consists in thorough disinfection; douching is not sufficient. Scrub parts with bichlorid solution, and keep dry; treat same as in non-pregnant, only more actively.

Syphilis in pregnancy may run the same course as in the non-pregnant woman, but it is apt to be more active; the tissues break down more readily, and lesions are more active and more extensive. It is invariably associated with ordinary infectious germs which make it worse.

Prognosis for fetus: If either parent is syphilitic before impregnation occurs, the child will be. A syphilitic woman becoming pregnant is almost sure to lose her child; while a pregnant woman becoming syphilitic is less apt to abort. If syphilis is contracted in first three months of pregnancy, majority of children will be syphilitic; in second three months, about 50 percent.; if in last three months, less than 50 percent.

Treatment is that for non-pregnant; but owing to presence of other germs and sloughing, local disinfection must be more active; mercury bichlorid wash and dusting with calomel is probably the best treatment.

Typhoid Fever is occasionally met with. In about 75 percent. of cases abortion results—1. From high temperature; 105 usually aborts. 2. Typhoid fever is apt to be associated with hemorrhage into membranes. 3. Embarrassment and enfeeblement of uterine circulation. There may be firm uterine contractions, from efforts to expel fetus.

Treatment: Bathing is not contraindicated; hence treat as in ordinary case. Stimulate patient. Let pregnancy go on. If the temperature remain near 105° very long abortion will probably occur. If hemorrhage from bowels occurs there may be also one from placenta. Ice bag over fundus may relieve contractions.

Erysipelas.—The danger to pregnant woman from erysipelas

is *very great;* hence do not attend the two cases together, but interchange cases with neighboring physician. If necessary to attend both, employ rubber gloves and use every precaution.

Measles.—Not commonly met with, as it is a rare disease in adults. Prognosis depends on grade of disease; high temperature or bronchitis favors miscarriage. It may be transmitted to child in utero.

Scarlatina is not uncommon. It may be transmitted to fetus. It is more serious during pregnancy owing to complications from pus germs; hence greater tendency to puerperal fever.

Small-pox.—If severe, it is almost sure to cause death of both mother and child; if mild, it is likely to kill child but spare mother; a child may recover same time as mother. See that patient is vaccinated as soon as exposed, as the disease is not then so severe.

Pneumonia.—A serious complication, as respiration is already taxed from pregnancy. Respiration is greatly embarrassed; hence miscarriage is very common, owing to poor blood, poor circulation, and high temperature. Give oxygen. If near term and respiration is much embarrassed, may induce labor, but even here it is better to let pregnancy proceed as the puerperium and pneumonia is a bad combination. The shock from induction, unless on verge of labor, is much greater than under normal conditions.

ANOMALIES AND DISEASES OF FETAL APPENDAGES.

Diseases of the Amnion.

A. Polyhydramnious (an excess of liquor amnii) { 1. Acute. 2. Chronic.

B. Oligohydramnios (a deficiency in liquor amnii).

Four pints of liquor amnii is the dividing line between an excess and a deficiency. The abnormalities are usually considered as faults of the amnion, but they may be due to an abnormal fetal circulation. In twin pregnancy, they are apt to be associated with one child.

Polyhydramnios.—Occurs in two forms. 1. Acute; it may develop in a single night, with pain, rise of temperature and vomiting. 2. Chronic; requires a longer time to develop.

Symptoms.—Abdominal tumor is too large for the time of pregnancy. Fetal heart sounds are weak. Fetus is more movable than normal, and maternal respiration is embarrassed from pressure of distention.

Results.—1. To mother: (a) Embarrassed heart, respiration and digestion; (b) labor is usually premature, due to overdistention of uterus; (c) labor pains are usually deficient, from uterine inertia; (d) sudden emptying of uterus is apt to cause postpartum hemorrhage. 2. To child: (a) Prematurity; (b) malposition, due to sudden gush of fluid; (c) prolapse of cord from abnormal presentation.

Treatment.—As a rule no treatment is required, as the cases are usually chronic. In the acute form, it is best to induce abortion; this form is rare.

Oligohydramnios.—With deficiency in fluid, the amnion is apt to fall in against fetus and form bands of adhesions; these bands may cause malformations from contraction of limbs and to malnutrition of fetus. The fetal movements are more distinctly felt than normally.

Diseases of the Chorion.

A. Cystic degeneration of the chorion villi (vesicular mole).
B. Fibromyxomatous degeneration of the chorion.

Vesicular Mole.—"Hydatidiform degeneration." A form of myxoma. Resembles a bunch of Malaga grapes; the vesicles are usually attached by separate stems but may be attached to each other. Begins usually in early months of pregnancy, but may occur in later months. Its presence always means pregnancy.

Etiology.—Present view, that it is strictly a disease of the chorion, as it may occur in one of twins, or even be present when live child is born; if present in one of twins, normal baby usually dies from impaired circulation. Cause is endometritis.

Pathology.—The disease starts in connective tissue of villi; the spaces become distended and filled with fluid; the framework of villus atrophies and disappears, leaving a single sac covered with epithelium. The degenerated villi adhere to walls of uterus, and may cause perforations.

Symptoms.—1. Abnormally rapid increase in the size of abdomen. 2. Bloody or watery discharge from uterus. 3. A boggy feeling of the uterus, with absence of fetal heart and movements. 4. Finding of expelled vesicles.

Diagnosis.—As a rule, several of the above symptoms are necessary to establish a diagnosis; the finding of vesicles is positive.

Treatment.— Disregard fetus; there is only one treatment—empty uterus as soon as diagnosis is made. Use great caution, and do not scrape too hard, as vesicles may penetrate uterine wall. Be prepared to meet hemorrhage; after washing out uterus, pack with gauze.

Fibromyxomatous Degeneration.—The intercellular spaces of the degenerated villi contain a solid, more fibrous element.

Diseases of the Decidua.

- A. Deciduitis
  - 1. Acute
    - (a) Exanthematous.
    - (b) Hemorrhagic.
    - (c) Purulent.
  - 2. Chronic
    - (a) Diffuse hyperplastic.
    - (b) Polypoid.
    - (c) Cystic.
    - (d) Catarrhal.
- B. Hemorrhage into decidua (decidual apoplexy).
- C. Atrophy of decidua.
- D. New growths of decidua.

Acute Deciduitis.—Comparatively rare. It may result from cholera and other infectious diseases; or from unsuccessful attempts to induce abortion, or from external injuries.

Exanthematous Deciduitis.—Results from extension into the uterus of eruptive skin diseases, e. g., measles. It results in miscarriage.

Hemorrhagic Deciduitis.—An uncommon form; is the result of Asiatic cholera, typhus fever, etc. The chronic form is more common.

Purulent Deciduitis.—Also a rare type. Is usually the result of malpractice.

Chronic Deciduitis.—These are much more common than the acute types of deciduitis.

Diffuse Hyperplastic Deciduitis.—A natural result of chronic endometritis. All ingredients of tissues are hypertrophied. The polypoid, cystic, and catarrhal forms are only continuations of this process in local areas.

Polypoid Deciduitis.—Consists of local spots of hyperplasia, usually on opposite side from atachment of ovum; they may be on anterior wall.

Cystic Deciduitis.—Due to an involvement of the utricular glands; the ducts become closed and form cysts.

Catarrhal Deciduitis.—This is a more general condition of the cystic form. It constitutes one form of "hydrorrhea gravidarum." The fluid may be retained above the ovum by adhesions of decidua reflexa and vera of opposite wall, and by rupture of adhesions come away with a gush. Hydrorrhea gravidarum must be differentiated from the discharge of liquor amnii:

Hydrorrhea Gravidarum	vs.	**Discharge of Liquor Amnii.**
Discharge occurs days and weeks before labor.		Discharge immediately precedes labor.
Usually no premonitory symptoms.		Usually preceded by labor pains.
Discharge usually occurs at intervals.		Discharge usually but once.
Os closed.		Os patulous.
Ballottement possible.		Ballottement impossible.
Fluid is highly albuminous and contains mucin.		Fluid has only trace of albumin; considerable urea and urates.

Hemorrhage into Decidua.—"Decidual apoplexy." This is a rare affection *per se,* and is the result of Asiatic cholera, etc., It is common as a premonitory symptom of abortion.

Atrophy of Decidua.—The decidua may not form a firm lodging place for ovum, owing to an atrophic condition; the ovum falls to cervix, lodges and develops, the result being cervical pregnancy.

New Growths of Decidua.—"Deciduoma malignum," or "deciduo-sarcoma," may follow pregnancy, developing at the placental site. "Carcinoma syncytiale," or "syncytial cancer," also develops at placental site, and is perhaps more common than sarcoma.

Diseases of the Placenta.

A. Placentitis
   1. Acute.
   2. Chronic
      (a) Simple.
      (b) Syphilitic.
      (c) Tubercular.
B. Hemorrhage into and behind placenta (placental apoplexy).
C. Œdema of placenta.
D. Degeneration of placenta.
E. Cysts and tumors of placenta.

Acute Placentitis.—A rare affection; generally the result of dirty instruments.

Chronic Placentitis.—This is the more common form of placentitis. There are three types:

Simple Placentitis.—This is generally secondary to a deciduitis.

Syphilitic Placentitis.—The result of syphilis in either the father or mother. If from disease in father, the chorionic villi are affected, the vessels being closed; if from disease in mother, the maternal structures are involved.

Tubercular Placentitis.—This is not a common form. Miliary tubercles may develop in placenta.

Placental Apoplexy.—Hemorrhage into or behind placenta may be produced by trauma, such as excessive sexual intercourse, a blow or a fall, etc.; but it is most commonly due to acute inflammation. The amount of escaped blood may be small, and confined to small areas; or it may be great in amount, separating the whole placenta.

Results.—As a rule the ovum is expelled early, forming the "bloody mole"; or it may be retained longer, forming the "fleshy mole"; while if retained still longer, lime salts may be deposited in the ovum, when it becomes the "calcareous mole." It is also known as "blighty ovum," or "molar pregnancy."

Œdema of Placenta.—This may be simply an accumulation of serum under placenta, due to constriction of umbilical vein in the fetus; or it may be confined to small areas, resulting from pressure on small vessels.

Degeneration of Placenta.—The placenta may undergo

fibrous, fatty, amyloid, or calcareous degeneration; or a syphilitic degeneration, resulting in a large, pale placenta.

Cysts and Tumors.—Cysts are mainly results of changes in extravasated blood; tumors are fibromyxomatous of villi.

Malformations and Anomalies of the Placenta.

- A. Size
  - 1. Large
    - (a) Thin (placenta membranacea).
    - (b) Thick.
  - 2. Small
- B. Shape
  1. Horseshoe.
  2. Placenta marginata (crescentic or circular).
  3. Battledore.
  4. Annular.
  5. Placenta Fenestrata.
- C. Number
  1. Bipartita (duplex).
  2. Tripartita (placenta multiloba).
  3. Placenta succenturiata.
- D. Position (placenta previa).

Anomalies in Size.—The placenta may be excessively large and thin, due to persistence of all of chorion frondosum (the placenta membranacea); it may cover whole interior surface of uterus. On the other hand, it may be abnormally large and thick, due to the irritation from a chronically inflamed endometrium. It may be abnormally small, from ill-development of child, or from atrophy. The placenta may vary considerably in size; its thickness is in inverse ratio to its extent, and the younger the ovum, the greater the relative size of the placenta.

Anomalies in Shape.—The placenta is normally round or oval, and disc-shape; it may present many variations in shape.

Horseshoe Placenta.—When it surrounds os; or in twin pregnancy, from union of two placentæ.

Placenta Marginata.—Consists in a fragment of placenta at the margin of normal organ; it must be either crescentic or circular.

Battledore Placenta.—Not an uncommon form; the cord is attached to, or near, placental margin.

Band Placenta.—"Ring," or "annular," placenta; attached around whole circumference of uterus.

Placenta Fenestrata.—"Fenestrated placenta"; due to failure of chorion frondosum to develop in certain areas.

Anomalies in Number.—There may be two or any number of placentæ (bipartita, tripartita, succenturiatæ).

Anomalies in Position.—The placenta should normally be attached to the upper uterine segment (fundus); when it is attached to lower uterine segment (the part which expands during labor), it constitutes "placenta previa."

Diseases and Anomalies of the Cord.

- A. Diseases of cord
  - 1. Of vessels
    - (a) Stenosis.
    - (b) Varicosities.
    - (c) Hypertrophy of valves.
  - 2. Of substance
    - (a) Cysts.
    - (b) Calcareous degeneration.
    - (c) Tumors.
- B. Anomalies of cord
  - 1. Knotting
    - (a) True.
    - (b) False.
  - 2. Excessive torsion.
  - 3. Coiling.
  - 4. Length
    - (a) Short.
    - (b) Long.
  - 5. Size
    - (a) Thick.
    - (b) Narrow.
  - 6. Vascular.

Diseases of Cord.—The diseases of the umbilical cord have to do principally with the vessels.

Stenosis of Vessels.—A common condition, and is usually due to syphilis. When the vein is obstructed there is a damming back of blood in placenta; while stenosis of the arteries causes stasis in fetus.

Varicosities.—This is rather an anomaly than a disease. If small, they form cysts; if large, they may rupture and cause death of fetus.

Hypertrophy of Valves.—Usually caused by syphilis; small knots, which can be felt, are produced in vessels.

Cysts of Cord.—These are produced by obstructions to the vessels and effusions into Wharton's jelly. Child usually lives but is apt to be feeble.

Anomalies of Cord.—These result both from abnormalities in development, and from abnormal fetal movements.

Knotting of Cord.—Most common in the multipara, when a

freely movable child passes through a loop in the cord. If cord be short, the knot may be drawn tight and result in strangulation; while if cord be long, knots usually remain loose and cause no damage. "False knots" are due to collections of mucous tissue.

Excessive Torsion of Cord.—Probably a postmortem change, resulting from great movability of a fetus dying from the fifth to seventh month. It may cause obliteration of the vessel.

Coiling of Cord.—Cord may become coiled about the neck or extremities; there may be one to eight or more turns about the neck, which may cause malposition or abnormal attitude from extension of head. The cord may be so shortened from coiling as to cause malposition, or premature separation of placenta. If coils be tight they may cause malformations of part surrounded, by obstructing circulation.

Anomalies in Length.—The cord may be excessively long—even 9 ft.; or abnormally short—½ in. being the shortest, 2 in. next; these are very rare.

Anomalies in Thickness.—The cord may be abnormally thick, from cysts, or collections of Wharton's jelly; or abnormally thin, from excessive torsion.

Vascular Anomalies.—The cord may have two arteries and one vein, or two veins and one artery; or there may be one of each or two of each.

ABORTION AND PREMATURE LABOR.

Definition.—An arrest of gestation and expulsion of ovum before seventh month. (Always use the word "miscarriage" in presence of patient.) After seventh month, the term "premature labor" is used. (Some authors call expulsion of ovum up to the third month "abortion"; from third month to viability of child, "miscarriage"; and from viability to term, "premature delivery.")

Etiology.—Abortion may be produced from a variety of different causes. More than one-half of the patients will give history of a previous miscarriage. It is especially common in early married life, probably owing to trauma from too frequent sexual intercourse.

Traumatic Causes.—Any severe violence or trauma may produce abortion. 1. Blows and falls. 2. Excessive action of abdominal muscles; as from coughing, sneezing, straining at stool, etc. 3. The introduction of instruments; causing hemorrhage into membranes. 4. Frequent sexual intercourse.

Maternal Causes.—The maternal causes of abortion may act through several different channels: 1. Through the blood—from syphilis, excessive temperature (above 105° F.), malaria, from drug poisoning, and poisoning from noxious gases; the condition of the blood itself being anæmic. 2. Through the nervous system—from mental shock, reflex irritation of nipple from nursing, and from mental diseases, such as chorea, epilepsy, and convulsions. 3. Through local causes (something in uterus)—from inflammation of lining (endometritis), displacements with fixations in malpositions, lacerations of cervix, tumors, and placenta previa.

Fetal Causes.—Anything causing death of the fetus may be classed as a fetal cause of abortion.

Paternal Causes.—The paternal causes of abortion are—1. Syphilis. 2. Any constitutional exhaustion; as from excesses of any kind, and especially sexual (unhealthy sperm).

Varieties of Abortion.—Abortion is divided according to the symptoms into "threatened" and "inevitable"; according to degree into "complete" and "incomplete."

Threatened Abortion.—The symptoms of abortion may be severe, and yet pregnancy continue.

Inevitable Abortion.—When the symptoms (pain and hemorrhage) are combined with dilatation of the cervix, abortion is inevitable.

Complete Abortion.—When the entire ovum is expelled; this does not usually occur after second or third week.

Incomplete Abortion.—When a part of ovum (membranes, etc.) is retained in uterus; usual result after third or fourth month, as membranes rupture. If a young ovum is passed soon after separation, forming a fresh blood clot, it constitutes the "bloody mole"; if retained until clot organizes, the "fleshy mole."

Symptoms.—If abortion occurs within the first two or three weeks after impregnation, the symptoms differ from those of

menstruation only in degree—there is more pain, a greater flow, and more irritation of bladder; hence it may be mistaken for delayed menstruation. If abortion occurs from second to third month, it presents a different picture: The prodromal symptoms are pain in back, bladder irritability, and a mucus discharge; the active symptoms are pronounced pain, dilatation of cervix and hemorrhage, the hemorrhage being either into or between the membranes.

Treatment.—The treatment of abortion is both prophylactic and active.

Prophylaxis.—The prophylactic treatment of abortion consists mainly in proper education of the public: 1. Moral and physical responsibility should be impressed upon the patient. 2. Need of care if accident threatens; many ill results are liable if proper rest is not taken.

Treatment of Threatened Abortion.—Look for cause; make sure that uterus is in correct position. Upon appearance of the prodromal symptoms, put patient to bed, keep her quiet and cool, and give morphin hypodermatically to quiet uterine contractions and keep nervous symptoms under control. After a few days, substitute codein (gr. ½ every 4 hours), and later fluid extract of viburnum (Hayden's compound) every 3 to 4 hours.

Treatment of Inevitable Abortion.—If cervix is rigid and woman is losing considerable blood, pack cervical canal and vagina; this stimulates contractions, dilates the cervix, and checks the hemorrhage. When the gauze is withdrawn it may contain the ovum. After cervix has dilated, the treatment is to control hemorrhage and empty the uterus. If patient is advancing well: If cervix is dilated, leave alone. After ovum is born, float it in water to see if complete; if no part is missing, the woman may safely be left alone, with the exception of surgical cleanliness. It is usual to have a complete abortion after the third month; hence, if any doubt exists, anæsthetize patient and examine uterus. If woman is in pains but is not advancing well: Control hemorrhage by packing vagina with gauze, which helps to control by damming back blood; at end of twelve hours (or before if cervix is soft and dilatable), give anæsthetic, dilate cervix with the fingers (or instruments if necessary), and empty uterus. Contractions may be stimulated with ergot (fl. ex. m. 30

every 4 hrs.), strychnia (gr. 1-30 every 4 hrs.), or quinin (gr. 5 every 4 hrs.).

Dilatation of cervix: Hold down perineum (with a Sims' speculum), steady cervix, and dilate gradually in all directions; first using glove-stretcher dilator, then one finger, then two, etc.

Emptying of uterus: 1. Best to use finger, as by tactile sense it shows presence or absence of placenta; to explore fundus, use two fingers, depressing fundus with external hand. 2. Curette—disadvantageous, as it gives no tactile sense and placenta may be left; hence best to examine with finger after currettage. Break up membranes, etc., with fingers, then douche out debris; if curette must be used, remove debris with looped-end sponge holder (one blade may be used as a curette). Use great care not to puncture the uterine wall, especially if uterus is diseased. The curette should have a firm shank, and should not be sharp but should have one surface flat; *don't use a sharp curette.* Use force in coming out with curette, but none going in.

After-treatment of Abortion.—If the uterus remains ballooned-up and bleeding from retained secundines, disregard bleeding and go ahead until empty; then douche with hot salt solution, or hot bichlorid, 1-5000. If bleeding is excessive, pack the uterus with gauze (from tube) until fairly full; this is not necessary for drainage however. A sponge holder may be used to pack uterus. The uterus is subinvoluted and patient should stay in bed for nine days. Two weeks should be devoted to getting over the miscarriage.

Dangers from Miscarriage.—1. Acute anemia may result from excessive bleeding. 2. The greatest danger in neglected abortion is from infection, which may set up septic metritis, salpingitis, or peritonitis. 3. Malpositions, etc., of uterus are liable to result, hence need of quiet to prevent subinvolution.

Subsequent Miscarriage.—One abortion renders a woman more liable to another attack; a second renders her liable to habitual abortion from—1. Subinvolution (the most common cause). 2. Endometritis.

Habitual Abortion.—This is most commonly the result of subinvolution, from a second impregnation having occurred before involution has been complete. The best treatment is to

have separate beds for parents, or advise a six months trip abroad for one. To prevent subsequent abortion, keep woman in bed one week during usual menstrual periods until after fourth month; or constantly if symptoms persist. Avoid sexual intercourse entirely, or especially near the time of menstruation. If any indication of miscarriage should occur, institute treatment for threatened abortion; it may not be necessary to keep patient in bed, but keep her off her feet; after the third month, she may be let go about, and may take rides over smooth roads, etc.

Missed Abortion.—A miniature abortion, with the dead fetus retained. There is danger of septic infection, hence best to empty uterus. Fetus may be retained for several years, the skeleton only remaining unabsorbed. If the membranes are intact, fetus may mummify and remain an indefinite time; or it may be absorbed, or may form a polypus, the fetus remaining aseptic; these cases are rare.

FORCES INVOLVED IN MECHANISM OF LABOR.

Resisting Forces.—Canal or Passage.

Bony Parts.—The pelvis—two innominate bones and sacrum. In early life these are not united; sutures at acetabulum do not unite until eighteenth year; innominates and sacrum, not till middle age, coccyx still later in life. Hence there is some movement during child-bearing period, especially at coccyx (2 cm.).

Union.—The symphysis is united by ligaments which are important: The anterior, strong, has deep and superficial set of fibres. Inferior, important in symphysiotomy, is very strong, and until cut, pubes will not separate. All joints are amphiarthrodial (limited motion); all have small synovial sacs. Posterior ligaments of sacrum allow some motion, which is desirable; but they may become stretched, causing great pain, difficulty in walking, etc.

Position of Pelvis.—With body in standing position, plane of brim makes an angle of 55° with the horizon. Promontory of sacrum is 9 cm. above pubes. Tip of coccyx is 2 cm. above apex of pubic arch. Plane of pelvic outlet passing through tuberosities and coccyx, makes an angle of 11° with horizon.

Pelvic Brim.—Cordiform, due to projection forward of the sacrum; the shape varies in different races, being circular in Australians, and oval antero-posteriorly in Africans. Brim divides true and false pelves.

Pelvic Axes.—Axis of inlet, strikes coccyx and umbilicus; axis of outlet, is a line from middle of promontory to a point midway between tuberosities. The pelvic canal is a curve to which the axes are tangent; called "curve of birth canal," or "curve of Carus."

Soft Parts.—The bony canal is cushioned by soft parts—flattened muscles, and fascia.

Muscles.—Ilio-psoas muscles, on each side of false pelvis. True pelvis—sides and anteriorly, obturator muscles; back, pyriformis muscles from the second, third and fourth sacral vertebræ.

Pelvic Diaphragm.—Skin below, peritoneum above, and important muscles and fascia between. From without inward—1. Skin; superficial and deep fascia, two layers each. The deep layers of superficial fascia are attached to the rami and surround the transversus muscles. 2. Muscles—compressor vaginæ (or bulbo-cavernosi); transversus perinæi; ischio-cavernosi; sphincter ani; and levatores ani. 3. Vagina—"a mucous slit in pelvic floor"; in front is anterior segment of pelvic floor, which is pulled up in labor; behind is posterior segment, which is pushed down in labor. 4. Levatores ani and coccygeus. Levator is most important; it is a paired muscle, arises on posterior surface of rami, and "white line" of pubes; runs downward and backward, some fibres uniting in raphe in front of and behind rectum, others are attached to coccyx; function is to support perineum, and raise it up after defecation or parturition.

Pelvic Shape.—It is important to consider the shape and measurements of pelvis as a whole.

Diameters of Pelvis.—For taking pelvic measurements, the fingers, a tape-measure, and a pelvimeter are employed.

External Measurements.—Taken at the following points: Average between anterior superior spines; distance between crests; oblique (the right as a rule being longer), measured

from posterior superior spine to anterior superior spine of opposite side; external conjugate, measured from tip of last lumbar vertebra to upper border of symphysis.

Between spines	26 cm.
Between crests	28 cm.
External oblique	22 cm.
External conjugate	20 cm.

Measurements at Brim.—Conjugate, or antero-posterior diameter, measured from promontory of sacrum to symphysis; right and left oblique, from ilio-pectineal eminence to sacro-iliac synchondrosis of opposite side; transverse, at greatest width. The largest transverse diameter (13 cm.) is so far posterior that the promontory of sacrum prevents the long diameter of fetal head occupying it.

Internal conjugate	11 cm.
Right and left obliques	12 cm.
Transverse	13 cm.

Diameters at Outlet.—Transverse, from one to other tuberosity of ischium; obliques, from tuberosity to opposite spine; conjugate, from lower edge of symphysis to tip of sacrum (with movable coccyx). The first two only are of importance.

Transverse at outlet	11 cm.
Conjugate	9.5 to 11.5 cm.
Obliques	11 cm.

Diameters of Cavity.—The diameters of the pelvic cavity measure practically the same in all directions.

Cavity (pelvic contraction)	12 cm.

PARTURIENT CANAL.—Divided into three portions: 1. Supra-pelvic portion, formed of uterine muscle, psoas and iliacus. 2. Pelvic portion, the most important, as difficulty always lies here when present; formed entirely of bone. A bony ridge, extending from ilio-pectineal eminence to spine of ischium, serves to start rotation of head; two grooves are formed by this ridge, the anterior (anterior inclined plane) directed forward and downward; the posterior (posterior inclined plane) directed downward and backward. "The ball or head is directed down the anterior

or posterior inclined plane to the 'floor' or 'gutter,' and then forward"—(Cragin) 3. Infrapelvic, or hood portion, serving to hold passenger up against pubes, composed of perineum.

Characteristics of Female Pelvis.—The female pelvis differs from the male principally in its broader, flatter shape, and lighter weight.

Female	vs.	Male Pelvis.
Bones more delicate.		Bones heavier.
Points of muscle attachment less marked.		Surface rough and uneven.
Crests more flaring.		False pelvis more funnel-shape.
Symphysis shallower.		Symphysis deeper.
Pubic angle, 90°.		Pubic angle, 70° to 75°.
Tuberosities farther apart.		Tuberosities closer together.
Sacral promontory less projecting.		Sacral promontory more projecting.
Sacrum and coccyx less curved; sacrum broader.		Sacrum is narrower and more curved.

Resisting Forces.—Passenger or Fetus.

Measurements.—The average measurements of the head and shoulders of a normal term fetus are as follows:

Suboccipito-bregmatic diameter (S. O. B.)	9.50 cm.
Suboccipito-frontal diameter (S. O. F.)	10.50 cm.
Occipito-frontal diameter (O. F.)	11.50 cm.
Occipito-mental diameter (O. M.)	13.25 cm.
Biparietal diameter (B. P.)	9.25 cm.
Shoulders (S.)	12.25 cm.

Trunk.—The long diameter is transverse, but it will stand much lateral compression, even until long diameter is anteroposterior; the condition is the reverse in head, the short diameter being transverse.

Action of Head.—Long diameter of head comes down in the long diameter of pelvis. At pelvic inlet the long diameter of head is either in oblique or transverse diameter of pelvis; at outlet, it is in conjugate or oblique; hence rotation of head in canal is necessary for its passage. If head is well flexed it makes practically a ball, 9.50 cm. by 9.25 cm., and rotation is easy; hence good flexion is desirable.

Rotation of Head.—Rotation occurs mainly at the atlanto-axoidean articulation, some in cervical vertebræ. The head can turn to a right angle, the face looking over shoulder.

Expulsive Forces.—Uterus and Abdomen.

Onset of Labor.—There are many theories as to the cause of onset of labor, but none are conclusive. The most plausible explanation is that it is due to an overdistention of uterus at a normal menstrual period.

Duration of Labor.—Impossible to judge the exact length. In primiparæ the average length is 18 hours, 16 hours being occupied by the first stage and two hours by the second; while in multiparæ the average duration is 12 hours, 11 hours for the first stage and one for the second.

Premonitory Symptoms.—Usually intermittent contractions of uterus, with pain, at regular intervals. There is an increase in muco-purulent discharge, and increased irritability of the bladder.

First Stage of Labor.—Begins with first pain and ends with complete dilatation of cervix; the pains are irregular, about every half hour, and gradually increase in force and frequency.

Second Stage of Labor.—Begins with dilatation of cervix and ends with expulsion of child. Perineum bulges with each pain. Pains in back and elsewhere.

Third Stage of Labor.—Begins with birth of child and ends with expulsion of placenta and contraction of uterus.

Uterine Pains.—The uterine contractions are appreciable by sight and palpation. During each contraction the uterus becomes harder and more spherical, the antero-posterior diameter increasing. The contractions are rhythmical, intermittent, and involuntary. It is the regular occurence and disappearance of the pains that shows labor is commencing.

Adjuncts to Pains.—Contractions of the abdominal muscles, both voluntary and involuntary, assist in emptying uterus; the thorax and pelvis are fixed and the abdominal wall narrowed, compressing parts below; this causes congestion of organs, especially of cervix and lower uterine segment; dilatation is thus favored by the softening.

Force of Pains.—It has been estimated that uterine muscle exerts a pressure of from 50 to 100 lbs.

Effect of Pains on Uterus.—Lower segment: The fibres are loosely connected and passive, hence this segment thins. Upper segment: Muscle is active and tends to thicken at expense of lower segment (contraction and retraction). This explains danger is manipulation after labor is advanced—the lower segment is thin and easily ruptured, while upper segment rides above baby "like a cap." The "ring of Bandl" is the thickened lower edge of the upper uterine segment (contractile portion) after labor has been going on for some time. It shows that the lower segment (relaxed, attenuated portion) is thin and that manipulations are dangerous.

Dilatation of Cervix.—Begins at the internal os and extends downward. Due to several factors: 1. Congestion and softening of tissues. 2. Contraction of longitudinal fibres, which draws cervix up into lower uterine segment. 3. Bag of waters acts as a fluid wedge, the presenting part of membranes being the shape of a watch glass. 4. The presenting part acts as a solid wedge. If the cervix is long and somewhat rigid, labor will not as a rule take place inside of two weeks; while if it is softened and drawn up labor will probably take place within two weeks.

PRESENTATION, POSITION AND MECHANISM.

Presentation.

- A. Longitudinal
  - 1. Cephalic
    - (a) Vertex.
    - (b) Brow.
    - (c) Face.
  - 2. Pelvic
    - (a) Breech.
    - (b) Foot.
- B. Transverse
  - 1. Hip.
  - 2. Trunk.
  - 3. Shoulder.

Presentation.—That part of fetal ovoid which first offers at the superior strait.

Vertex Presentation.—Occurs in 97 percent. of cases. Due to —1. Gravity, head of fetus being heavier. 2. Adaptation of fetus to shape of uterus.

Position.

Occiput to
- 1. Left (L. O.)
- 2. Left and — (a) Anterior (L. O. A.); (b) Posterior (L. O. P.)
- 3. Right (R. O.)
- 4. Right and — (a) Anterior (R. O. A.); (b) Posterior (R. O. P.)

Position.—The relation of presenting part to certain fixed landmarks of pelvis.

Relative Frequency of Different Positions.—The most frequent position is L. O. A., occuring in 70 percent. of cases; R. O. P. occurs in 20 percent. of cases; R. O. A. and L. O. P. together in 10 percent. The combined anterior and posterior positions occur in the majority of cases, while the occiput positions make up 97 percent. of all labors. Positions other than occiput are anomalous.

Explanation of Frequency.—The right is the longer of the two oblique diameters—1. Right oblique is 22+ cm. as against 22 cm. of left. 2. Rectum reduces left oblique diameter. The long diameter of head seeks long diameter (right) of pelvis.

L. O. A.—Diagnosis.—Diagnosis of presentation and position is made by external inspection, auscultation, and palpation; and by internal manipulation.

Palpation.—In L. O. A., note—1. Long axis of fetal body is longitudinal. 2. Hard mass of head is felt below, with a distinct prominence of forehead on right side due to flexion. 3. Soft mass (buttocks) is felt above. 4. Broad, smooth back is felt in front and to left. 5. Movements felt more plainly on side to which child is facing (right).

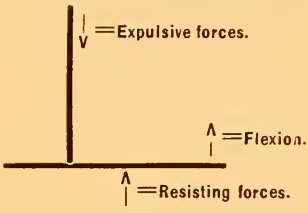
Auscultation.—Fetal heart is heard to left, between umbilicus and anterior superior spine.

Vaginal Examination.—Have hands sterile; separate labia with one hand to avoid carrying bacteria from vulva into vagina; pass fingers of other hand directly into vagina. The right parietal bone should be felt in L. O. A., with posterior fontanelle to left; anterior fontanelle should not be felt.

Mechanism of L. O. A.—The mechanism of L. O. A. can be

taken as a type for all positions, with certain modifications for each. The steps before labor are:

Flexion.—Begins with the onset of labor and continues until the nape of the neck comes under symphysis. Flexion is due to the fact that a line representing the spinal column (expulsive forces) intersects a line representing the head (flexion) posterior to its center. Advantage—substitutes a larger (occipito-frontal) for a smaller diameter (suboccipito-frontal).



Dilatation of Cervix.—Cause—pressure of bag of waters and presenting part. Advantage—allows head to come down.

Lateral Inclination.—Cause—posterior parietal bone catches on promontory of sacrum and head swings backward. Advantage—brings long axis of head perpendicular to plane of brim, and in the axis of canal.

Descent.—Time—during last two weeks of pregnancy. Cause—extension of fetal spine, weight of child and contraction of uterus. Advantage—brings head in position for moulding.

Moulding.—Cause—adaption of soft bones of fetal skull (vault) to shape of pelvis. Advantage—permits large head to come through small passage and avoids uneven pressure on tissues of head and pelvis.

The steps during labor, besides a continuation of the foregoing, are

Anterior of Rotation.—(45°). Necessary owing to the reverse measurements of pelvic inlet and outlet. Due to—1. Groove in wall of pelvis which engages presenting part and starts rotation. 2. Soft parts of pelvic floor, levatores ani being main element (found from experiment that after soft parts are stretched the head does not rotate). 3. Inclination of pelvis. 4. Inclination and shape of head. The occiput, or any part first striking the anterior inclined plane, is carried downward, forward and inward under the pubes.

Extension and Birth of Head.—Due to—1. The resistance of pelvic floor below. 2. The absence of resistance in front. 3. A continuance of propelling force. Advantage of extension—causes

least pressure on perineum, as the smallest diameter of head (suboccipito-frontal comes through vulvar opening. During the last two steps the shoulders are engaging in the left oblique diameter.

Restitution.—(45°). Due to the recoil of tissues of neck, the head assuming the normal relation to the shoulders. The occiput turns to the left of mother.

External Rotation.—(45°). Due to the rotation of shoulders in birth canal. The anterior, or right, shoulder being lower, first strikes the pelvic floor and is directed downward, forward and inward under the pubic arch. The occiput rotates further to the left of mother.

Lateral Flexion and Birth of Shoulders.—The mechanism varies, depending on whether—1. Left to Nature, or assisted. 2. Primipara or multipara. In primiparæ, the anterior shoulder is best born first, as tissues of brachium are more easily compressed under symphysis than are tissues of the achromion.

R. O. A.—Diagnosis.—Diagnosis about same as of L. O. A., except for frequency and reverse directions. Mechanism is practically the same, with exception of reverse directions of movements.

External Examination.—1. The fetal heart is heard to right. 2. Prominence of forehead is felt to left. 3. Back of fetus is felt to right.

Vaginal Examination.—1. Left parietal should be first felt. 2. Small fontanelle to right. 3. Sagittal suture in left oblique.

R. O. P.—Diagnosis.—The most important points in diagnosis are the presence of small parts in front and fetal heart in right flank. Pains are not as effective as normally, and there is slow advance.

External Examination.—1. Small parts felt in front. 2. Fetal heart is heard in right flank. 3. Forehead is felt in front.

Vaginal Examination.—The anterior fontanelle is felt, owing to extension of head; this is bad.

Mechanism of R. O. P.—The mechanism of R. O. P. is the most difficult to grasp of all positions. Practically the same as

R. O. A., as in 96 percent. of cases the occiput rotates to front; in 4 percent. occiput goes behind.

Flexion.—There is extreme flexion, which renders the head almost circular; hence the occiput may go either forward or backward, depending on which side of the bony ridge it first strikes. However, the soft parts usually (in 96 percent. of cases) force occiput forward.

Persistent Occiput-Posterior.—In 4 percent. of cases the head is extended; the occiput goes down and back to pelvic floor, as it does in flexion, but rotation is prevented by impinging of head against spines of ischium, and presentation is O. P. There is tardy flexion, the nose being caught under the pubic arch till occiput escapes. Lacerations are common, hence it is customary to change to O. A. if possible.

Rotation.—The rotation is extreme, the head passing through three-eights of a circle to be born O. A.

L. O. P.—The most unfavorable of all occiput positions. The mechanism is practically the same as in R. O. P. but labor is more tedious. Strong pains are necessary, labor is prolonged, and there is much pain and exhaustion.

MANAGEMENT OF PREGNANCY AND LABOR.

During Pregnancy, every effort should be made to become familiar with the woman's condition. The measurements should be made early and any abnormalities noted. Examine the urine every two weeks and the patient every four weeks. Instruct the patient not to eat red meat more than once a day, and none at all if urine is abnormal. She should drink plenty of water, about six glasses daily.

Obstetrical Bag.—A dress suit case answers the purpose best as it does not expose the nature of its contents, is easily carried, and is well adapted to hold trays with square corners.

Contents of Bag.—Trays, etc., should be made to fit into bag neatly and compactly. The following list of instruments, etc., will be found to answer most cases. As soon as arriving at home of patient, put instruments in small tray with water and soda and put on stove to boil.

Supplied by Physician.

1. Metal trays { (a) Short tray for scissors, etc.; to telescope larger. (b) Long tray for forceps.
2. Instruments { (a) Looped-end sponge holder. (b) Thumb forceps. (c) Needles and needle clamp. (d) Artery clamps. (e) Scissors.
3. Nickel bottle cases containing { (a) Chloroform. (b) Protargol or silver nitrate. (c) Tincture of green soap. (d) Lysol. (e) Acetic acid solution. (f) Tablets of mercury bichlorid. (g) Ergotol.
4. Tubes containing { (a) Sterilized catgut. (b) Sterilized tape. (c) Sterilized silkworm gut.
5. Delivery forceps.
6. Sterilized supplies (use own sterilizer) { (a) Gauze. (b) Absorbent cotton. (c) Vulva pads (d) Catheter (best).
7. Dropping bottle of chloroform.
8. Esmarch's inhaler for chloroform.
9. Bag for dilating cervix, with a Davidson syringe for distending it.
10. Sterile fountain syringe.
11. Sterile douche nozzle.
12. Tube of sterile gauze for packing uterus.
13. Sterile nail brush in bag.
14. Box of soda for sterilizing instruments.
15. Stethoscope.
16. Dress { (a) Sterile gown. (b) Sterile rubber apron.
17. Leg holder.
18. Kelly pad.

Instructions to Mother.—Instruct patient to have ready a list of articles similar to the following. They can be obtained cleansed, sterilized, and neatly packed, "like a Christmas box," from Van Horn & Co. (Suggested by Dr. E. B. Cragin.)

Supplied by Patient.

1. Two sterilized bed pads (30 in. square).
2. Two dozen sterilized vulva pads (one side non-absorbent).
3. Two sterilized mull binders (18 in. wide).
4. Six sterilized towels.

5. Ten yards sterilized gauze.
6. Two and one-half pounds sterilized absorbent cotton.
7. Rubber sheet, 1 yd. square.
8. Rubber sheet, 1½ x 2 yds.
9. Four-quart sterilized douche bag, with glass nozzle.
10. Douche pan.
11. Sterilized nail brush.
12. Two agate-ware basins.
13. Safety pins.
14. Tube lubri-chondrin.
15. Two tubes sterilized white vaselin.
16. Boric acid, powdered.
17. One hundred grams chloroform (Squibb's).
18. Ergotol.
19. Tincture of green soap.
20. Tablets of mercury bichlorid.
21. Lysol.
22. Tube sterilized tape.
23. Sterilized soft rubber catheter.
24. Sterilized glass catheter.
25. Stocking drawers.
26. Borated talcum powder.
27. Pattern of breast binder.
28. Bath thermometer.

Bed.—Instruct patient to have a high, firm, preferably metal bedstead, about height of ordinary table. A table will answer the purpose, being high and hard; or a board can be placed under mattress of a bed with springs to make it sufficiently firm, and blocks under legs will make it proper height. Have bed made up as follows, with everything as sterile as possible:

1. Mattress, covered with sheet.
2. Rubber sheet, full length.
3. Ordinary sheet, no wrinkles. Fold corners under to make it fit well.
4. Short rubber sheet for hips, covered with draw sheet.
5. Absorbent bed pad, to hold all excreta. (Use other for puerperium).
6. Upper sheet, blanket, and covering, folded up at foot of bed.
7. Pillow.

Tenement Houses.—Very few conveniences can be expected in a tenement house, and physician must improvise things as needed. 1. A table oilcloth and clean sheet (one newly laundered

will answer) can be used to cover mattress, which will probably be a dirty feather tick. 2. Have Kelly pad, as near sterile as possible, on edge of bed, and covered with sterile towels. 3. A wash boiler may be used for boiling water. 4. Stocking drawers can be improvised. 5. Cover the entire field with towels wrung out of bichlorid solution.

Directions for Nurse.—1. Move bowels by enema before labor begins. 2. Give surgical bath, especially of vulva and hips, with soap and water, and brush. 3. Give *no vaginal douche* except when specially indicated, as normal secretions of vagina are sterile and have bacteriacidal power. 4. Have woman on back, preferably, if bed be clean and high; if bed is low and dirty, have woman on side, as buttocks can be brought well to edge of bed and field well covered with sterile towels. 5. Clip hair on vulva.

Behavior at Case.—"Go when called" is of first importance, as a woman in labor has precedence over all other patients. When with patient, "simply act as a gentleman."

First Stage of Labor.

Examination of Patient.—Thoroughly examine condition of patient, but make as few examinations as possible.

Vaginal Examination.—One, at least, is necessary, but make just as few as possible. Best substitute external examination. Always clean vulva with bichlorid or lysol solution before making vaginal examination; then separate labia with one hand and insert examining fingers directly into opening.

External Examination.—1. With hands on upper abdomen, feel hard mass (head), or soft, irregular, kicking mass (feet); thus ascertain if head is above or below, breech to right or left. 2. Facing feet of woman, place one hand on each side of abdomen; if hard mass (head) is felt in pelvis, note on which side it projects farthest (face—usually to right), and opposite smooth, straight side (occiput, from flexion—usually to left). 3. Note long diameter of hard mass: If long, it is the occiput (O. A); if short, it is the face (O. P.). 4. Fetal heart, most commonly heard at the center of a line joining umbilicus and left anterior

superior spine (L. O. A.); if R. O. P., heart is heard to right and well in flank, the sinciput is felt more distinctly, soft small parts are prominent, to front and left; if L. O. P., heart is heard in left flank, small parts prominent, to front and right, narrow forehead right and front.

Care of Woman.—If everything is found all right, allow labor to advance. Let patient walk as she chooses, but do not let her become exhausted, however. Avoid chloroform in first stage if possible.

Second Stage of Labor.

Care of Patient.—Have patient in bed. If chloroform is necessary give a few whiffs during pains. Pulling on a knotted sheet attached to foot of bed will aid pains. Make as few vaginal examinations as possible; one before and one after rupture of membranes to ascertain if cord is prolapsed. Keep sterile pad over vulva.

Moulding of Head.—Sutures of fetal skull allow overlapping of flat bones (moulding), causing an increase in long diameter and narrowing of transverse diameter of head. This requires time and pains.

Control of Head.—1. Support perineum, in order to throw the long diameter of head in line of long axis of canal. 2. To prolong process use (a) chloroform, and (b) back pressure on head until complete control can be had of it—don't let head come out suddenly. 3. With patient under chloroform, place left elbow on abdomen over fundus, and fingers of left hand on fetal head to control its advance, pulling head forward until right middle finger can engage chin; have thumb and forefinger of right hand on labia, posterior to and encircling presenting part of head; and middle finger, flexed, and usually behind anus, engaging the chin and holding head up under symphysis. If vulva sticks on occiput, pull it back with left fingers, then gradually extend head as it escapes from vulva. As soon as head is born look to see if cord is about neck; if so remove it by slipping cord over head or shoulder, or tying and cutting.

Birth of Shoulders.—Depress head until anterior shoulder

engages under symphysis, then bring head forward and let posterior shoulder slip over perineum.

Caput Succedaneum.—The œdema of scalp over presenting part of head, and outlined by opening in the cervix. Must be distinguished from cephalhematoma—caput subsides in a few hours.

Lacerations of Perineum.—The causes of perineal lacerations are—1. Disproportion between passage and passenger—large head with small canal. 2. Malformations of pelvis, e. g., a masculine pelvis, with an acute subpubic angle and a long symphysis. 3. Lack of elasticity, especially in patient past thirty-five. 4. A too rapid advance of presenting part.

Prevention of Lacerations.—1. Keep long axis of head in axis of birth canal. 2. Control labor by chloroform, and by back pressure on head, with finger behind anus engaged under chin.

Third Stage of Labor.

Care of Child Before Birth of Placenta.—Clean out mouth with boric acid gauze on little finger as soon as mouth is born. If child is puny, let it rest a few minutes before cutting cord, as it will gain a few ounces in weight from blood left in placenta by—1. Aspiration of fetal chest. 2. Contraction of uterus on placenta. During this time, take temperature of child by rectum.

Care of Cord.—Treat cut ends of cord as surgical wound. If in haste, tie as long as convenient (about three inches), using sterile ligatures. Tie cord twice before cutting, on fetal and maternal side, as—1. There may be more than one baby, with placental anastomoses. 2. A large placenta (full of blood) is desirable for uterus to act upon. 3. It prevents soiling bed. The long initial stump allows for subsequent dressing.

Cutting of Cord.—Final stump should be left just long enough to tie again should ligature cut through—usually about one inch; both arteries may be tied separately if desired.

Tying of Cord.—Have ligatures and hands sterile. In drawing knot, press thumb against thumb to—1. Avoid tearing cord

from child if ligature slips. 2. Regulate pressure and prevent cutting. Ligate in two places, one ligature about one inch from navel; cut between ligatures.

Dressing of Cord.—Use sterile hands, sterile dressings, and keep the cord sterile. Sponge off cut end with sterile swab. Anoint abdomen with albolene, sterile white vaselin, or sterile olive oil, wherever dressing will cover it, and wipe off vernix caseosa. Surround stump of cord with a small piece of sterile white gauze (to be left for five days, then inspect to see if dry); around this put gauze bandage. *Do not put baby in tub until cord is separated.* After ten days, the cord may be gently twisted to see if yet loose. A core may persist if it receives nutrient supply; silver nitrate will remove this.

Care of Eyes.—Attend to eyes at once. Irrigate with boric acid solution from dropper—physician holding eyes open and nurse dropping solution. Follow this with protargol, 5 percent. solution—silver nitrate, 1 percent. solution, is not so good, as it may irritate. After caring for eyes, wrap child in blanket and put a hot water bag to its back, using great care not to burn child.

Treatment of Woman.—After expulsion of child, have nurse hold the fundus for at least fifteen minutes (better thirty), to cause its contraction upon placenta.

Mechanism of Third Stage.—(Expulsion of membranes and contraction of uterus.) Soon after expulsion of child, uterus contracts upon the placenta, which, like child, is gradually expelled by uterine contractions.

Separation of Placenta.—Due to—1 Diminution of surface to which placenta is attached is so rapid (from contraction of uterus) that the placenta is separated off. 2. Contraction of uterus is intermittent, and in intervals, blood is poured out behind placenta, dissecting it off. Placenta acts as a foreign body and is expelled from uterus.

Presentation of Placenta.—Usually edgewise (Duncan mechanism), with the fetal surface out, and membranes trailing behind on opposite side; or as an inverted umbrella, fetal surface first (Schultze mechanism).

Management of Third Stage.—As soon as child is born,

nurse gently massages fundus, continuing for fifteen minutes or longer; this tends to keep fundus against placenta, and prevents hemorrhage. Physician then performs Crede's method of expressing placenta. If this method does not cause birth of placenta wait half an hour before extracting it manually.

Expression of Placenta.—Crede's method consists in—1. Compression and kneading of fundus. 2. Downward pressure of fundus in conjunction with uterine pains. The placenta soon presents at vulva. Too vigorous downward pressure may cause inversion of fundus.

Delivery of Placenta.—Should be gradual, allowing the membranes to separate spontaneously. Do not twist membranes into a rope; gently elevating and depressing the placenta (outside) will aid in separating membranes.

Examination of Membranes.—Carefully examine membranes to see if intact. If considerable portions are lacking, *go after them;* if only a small portion is missing, await results.

Cleansing of Parts after Delivery.—Use sterile gauze or cotton, and a weak antiseptic solution; *do not use sponges.* In hospital practice, keep strip of gauze, wrung out of 1-5000 bichlorid solution, over vulva, under pad, for a few days. In private practice, simply cleanse with antiseptic solution and use pad.

Care of Uterus after Birth of Placenta.—The fundus should be held and gently massaged for at least an hour after birth of placenta; this causes contraction of uterus and prevents clots. Ergot may be necessary to contract uterus.

Abdominal Binder.—Should not be applied sooner than one hour after birth of child, and should be used for first five days.

Breast Binder.—(Murphy's). Prevents sagging of breasts, keeps them empty and thus avoids damming back of milk with subsequent infection and mastitis (providing nipples and baby's mouth are kept clean).

Rigor After Delivery.—A rigor, or chill, is commonly seen following labor; it simply means that body heat has been reduced, owing to increased loss; there may also be a nervous element, with decrease in heat production. It is not of much importance, and should be treated with blankets and hot-water bottles. In dirty cases, it may mean infection.

MANAGEMENT OF PUERPERIUM.

Care of Baby.

Institution of Respiration.—Sudden changes in environment, combined with abolition of placental respiration, and stimulation of respiratory center by accumulation of CO_2, normally causes institution of respiration, which is usually ushered in by a lusty cry. However, respiration may fail to be established, owing to asphyxiation.

Causes of Asphyxia.—1. Fetal inspiration. 2. Any interference with the placental respiration, as prolonged uterine contractions; coiling, compression, or prolapse of cord; the premature detachment of placenta; phlebitis of funic vessels, from syphilis. 3. Prolonged pressure of brain during labor. 4. Grave diseases and hemorrhages of mother. 5. Anomalies and diseases of fetus, preventing entrance of air. 6. Accidental causes preventing access of air, such as placing baby in unfavorable position; precipitate labor; imposition of caul.

Treatment of Asphyxia.—1. The application of exaggerated stimuli, as slapping buttocks; vigorous rubbing of body; alternate immersion in warm water and ice water, with gentle friction; application of electricity. 2. Artificial respiration, Schultze's method being preferable: Physician holds infant in hands, face to front, with thumbs over shoulders, index fingers in axillæ, and rest of fingers supporting back; the child is then swung alternately between knees and over the head, flexing head upon chest in latter position. This should be used in conjunction with immersion in warm and cold water. 3. Mouth-to-mouth insufflation, with child's head extended and mouth covered with gauze; only first part of expired air should be used, and baby's nostrils should be left open to act as safety valves. 4. Catheterization of larynx or tracheotomy may be practiced, as last resorts in cases of obstructed air passages, from disease, neoplasms, etc.

Eyes.—Immediately following birth, the eyes of all babies whether gonorrhea is present or not, should be irrigated with boric acid solution and 5 percent. protargol or 1 percent. silver nitrate solution.

Dressing of Navel.—Anoint abdomen with albolene or white

vaselin, and wipe off vernix caseosa; then apply gauze about cord, and bandage. Have hands and gauze sterile.

Bathing.—Instruct nurse not to wash baby for six hours; vernix caseosa may be wiped off with vaselin or albolene. Allow baby to become accustomed to its new environment before using water. Don't bathe in tub until cord is off; at end of six hours, may be bathed on lap.

Tub Baths.—Be sure of temperature of the water before immersing baby—have temperature above that of the body (105°). First wash face, with baby on lap, keeping body covered, and using any good soap (preferably castile). Put baby in tub, supporting occiput with hand, and first wash head. Cleanse creases well, to avoid eruptions. Don't wet umbilicus until completely healed—best have water shallow on beginning. Dry in sheet and blanket, gently rubbing outside with hand. After bath dust skin with talcum powder, and put sterile cotton over umbilicus if it is not yet firm.

Dress.—1. Abdominal band; after cord separates, this may be sewed on. 2. Shirt—short, made of flannel. 3. Slip—long, with arm holes and hole for neck. 4. Slip—muslin, over all. 5. Diapers—small one to collect excreta, and large one outside smaller, with apex unfastened, to protect dress.

Where to Put Baby.—Baby should be put in separate room, to avoid disturbing mother.

Feeding Baby.—Best to put baby to breast as soon as mother has rested for a time, as—1. First milk is the best laxative for baby. 2. Nursing stimulates contraction of uterus. 3. Stimulates development of milk secretion. Do not put to breast at night until milk comes; and thereafter no oftener than is necessary, leaving mother rest from 11 p. m. to 5 a. m. if possible. During day, put baby to breast every four hours until milk comes; afterwards, every two hours.

Care of Woman.

Length of Physician's Visit.—The length of time physician should stay with patient depends on her condition; if heart and respiration are all right, it is not necessary to remain. Instruct

nurse to watch—1. Fundus. 2. Lochia. 3. Temperature. 4. Pulse.

Temperature.—Take temperature of both mother and child twice daily; if above normal, every two hours.

Bladder.—The bladder may become greatly distended before woman has desire to empty it, owing to—1. Changed conditions above—the relief of pressure. 2. Œdema of urethra, from long continued pressure. Woman should try to empty the bladder every eight hours (unless lacerations, etc., have occurred); flow of urine may be stimulated by—1. Sound of water running from tap. 2. Warm water running over vulva.

Catheterization.—There may be an increased secretion of urine. If woman is unable to void urine, catheter should be passed every eight hours, and in some cases oftener, to avoid—1. Discomfort. 2. Overdistention, which favors postpartum hemorrhage by preventing involution. 3. Full bladder being mistaken for tumor.

Lochia.—Inquire about lochia on second visit. Better to have abundant flow than too little, as small amount may mean infection.

Amount and Character.—Pads should not be changed oftener than once in three or four hours; if oftener, the amount is excessive. In first few days, lochia is composed mainly of blood, as shown by appearance and smell. After first week, odor becomes characteristic of mucus; color becomes lighter, finally light yellow. Flow should cease at end of first month, the bloody character ceasing at end of second week.

Length of Time in Bed.—Depends on time required for involution, and this depends on nature of patient—whether a "hot-house" girl or shop girl, or one properly developed. Do not allow woman to get up until fundus can scarcely be felt above symphysis. General rule: Keep in bed for nine or ten days; second week, between bed and chair, being carried from one to other (no walking), and have feet elevated from floor while on chair; third week, may walk from bed to sofa or chair, lying down frequently; fourth week, allow all about the same floor; at end of fourth week, patient may go down stairs and take drives.

Use of Commode.—Patient may sit up to use commode after the fifth day (occasionally as early as third day). If in good condition, let patient slide off edge of bed onto the commode.

The sitting position allows drainage of lochia, but there is danger of embolus.

Care of Bowels.—Best not wait longer than thirty-six hours after labor to move bowels. Salines are agreeable—Rochelle salts or magnesium citrate; castor oil may also be used, and enemata are good to supplement.

Subsequent Visits.—Depend on the patient's circumstances. Rule in "Fifth avenue" case: First week, for one or two days, two visits daily; second week, one visit daily; third week, every other day; fourth week, one visit to discharge case.

Charges.—Best to have a definite charge for confinement, with a certain fee for each subsequent visit.

MILK.—FEEDING OF BABY.

Quantity of Milk.—Means of determining if normal: 1. The length of time baby nurses (should nurse at least twenty minutes). 2. Length of time baby sleeps (if hungry, will wake up—should sleep two hours). 3. Palpation and inspection (amount of milk expressed). Baby should be put to breast early in order to clear its bowels of meconium, and to stimulate contractions of uterus.

Composition of Milk.—Milk may be normal in amount, but poor in quality; it may contain abnormal elements, or the normal constituents may vary in amounts.

Colostrum.—Is of a high specific gravity and rich in proteids. It is laxative. Should disappear from milk by the twelfth day. Pus or blood cells should never be present.

Fat.—Keeps up body weight, saves nitrogenous elements, and maintains bodily heat.

Sugar.—Also keeps up weight of child, and maintains animal heat, being partly converted into fat.

Proteids.—Are essential to life, in building up tissues and replacing nitrogeneous waste.

Salts.—Necessary for the growth of bone; phosphates are the most important.

Soluble Albumin and Casein.—The albumin is in solution, while casein is held in solution by the phosphates.

Reaction.—Mother's milk is normally slightly alkaline; it should never be acid. Cow's milk is slightly acid.

Specific Gravity.—Woman's milk, 1027 to 1032, average 1031; cow's milk, 1030 to 1035. Fat lessens, proteids increase sp. gr.

Testing of Milk.—First milk from breast is poor in fat and rich in proteids, while later it is rich in fat and poor in proteids; to get average for testing, take from middle of milking.

Estimation of Fat.—Fill graduated cylinder (of lactometer outfit) up to 10 c. cm. mark with milk from middle of milking, and set away in a cool place for twenty-four hours; then—

Percent. of cream : percent. of fat :: 5 : 3.

Average Percentages of Milk.

Woman's Milk		vs.	Cow's Milk.	
Composition	Percent.		Composition	Percent.
Fat	4.00		Fat	4.00
Sugar	7.00		Sugar	4.50
Proteids	1.50		Proteids	3.50
Salts	.20		Salts	.75
Water	87.30		Water	87.25

Variations in Woman's Milk.

	Sp. Gr. (70°)	Cream (24 hrs.)	Proteids
Normal average	1031	7%	1.5%
Normal variation	1028-1029	8-12%	Normal (rich)
Normal variation	1032	5-6%	Normal (fair)
Abnormal variation	Low (1028—)	High (10%+)	Normal or little below
Abnormal variation	Low (1028—)	Low (5%—)	Very low (very poor)
Abnormal variation	High (1032+)	High	Very high (very rich)
Abnormal variation	High (1032+)	Low	Normal or nearly so

Substitute for Mother's Milk.—Nothing equals mother's milk; but if mother's milk will not nourish baby, then select best available substitute.

Mixed Feeding.—If mother has some milk, mixed feeding may be resorted to, using part modified cow's milk; mother's milk serving to keep bowels open.

Wet Nurse.—Select a congenial, healthy, well-bodied woman, about same age as mother. It is difficult to find a good one, and hard to keep her in the family. Look out for syphilis and

tuberculosis. A good "human cow" is needed; "the proof of the pudding is in the eating"—the condition of baby is the best evidence of agreement of milk. Important to examine condition of the other baby as well as the mother. An unmarried woman is preferable—1. She does not fret so much about her own baby. 2. She is not so apt to become pregnant. 3. Has fewer family ties. 4. Has no husband to bother her.

Milk of Animals.—Cow's milk is used almost exclusively in this country as a substitute for mother's milk; the composition of camel's milk is nearest that of human. Good milk from a reliable source is of the first importance.

Cow's Milk.—Mixed milk from herd is best, as it is not subject to so marked variations as milk from one cow, no matter how healthy she may be. Absolute cleanliness should be maintained of stables, cows, milkers and dairy, and first milk from teat should be discarded. The milk should be cooled immediately after milking and shipped at once, in bottles and on ice, to consumer. It is not necessary to sterilize good milk in winter time. Milk well cared for may have as few as 10,000 bacteria per c. cm.

Modification of Cow's Milk.—Baby can digest more fat in mother's milk than in cow's milk. Sugar must be added to cow's milk, while proteids are far too great in amount; hence cow's milk must be diluted to bring percentages below those of mother's milk (practically four times), and fat and sugar must be added. Dilution reduces proteids to .80 percent., as against 1.50 percent. in mother's milk—this being rich enough in proteids for baby. Cow's milk must be made alkaline.

Effect of Dilution of Cow's Milk.

	Normal Milk	Diluted Once	Twice	Three Times	Four Times
Proteids	3.50	1.75	1.16	.87	.70
Salts	.75	.37	.25	.18	.15

Gravity Cream.—As a basis for the modification of cow's milk gravity cream is used. It is the cream which rises to the surface after four to twelve hours from the time milk is set aside. Its average composition is fat 16 percent., sugar 4.50 percent. and proteids 3.50 per cent. From it are made the primary formulæ (10 and 7 percent. milk) used during the first nine months.

TO GET TEN-PERCENT. MILK.

From Gravity Cream.

	F.	S.	P.	
One part gravity cream.....	16	4.50	3.50	
One part plain milk.....	4	4.50	3.50	
2	20	9.00	7.00	
	10	4.50	3.50	= 10% milk.

From 12-hour Old Quart Bottle.

Take 10 oz. (upper third) milk from top of 12-hour old quart bottle. Remove with Chapin dipper (1 oz.); first remove enough with spoon to fill the dipper once, then dip up 9 oz., disturbing milk as little as possible.

TO GET SEVEN PER CENT. MILK.

From Gravity Cream.

	F.	S.	P.	
One part gravity cream.....	16	4.50	3.50	
Three parts plain milk.....	4	4.50	3.50	
	4	4.50	3.50	
	4	4.50	3.50	
4	28	18.00	14.00	
	7	4.50	3.50	= 7% milk.

From 12-hour Old Quart Bottle.

Take 16 oz. (upper half) of top milk from a 12-hour old quart bottle with a Chapin 1-oz. dipper; this makes practically 7% milk.

TO MAKE FOOD FOR DIFFERENT AGES.

Age	Lime Water	Milk	5% Sugar Sol.	Composition F.	S.	P.
1 day.....	1 oz.	1 oz. 10%	to 20 oz.	.50	5.20	.17
2 days.....	1 oz.	2 oz. 10%	to 20 oz.	1.00	5.40	.33
3 days.....	1 oz.	3 oz. 10%	to 20 oz.	1.50	5.60	.50
4 to 10 days..	1 oz.	4 oz. 10%	to 20 oz.	2.00	5.80	.60
10 to 30 days.	1 oz.	5 oz. 10%	to 20 oz.	2.50	6.00	.85
1 to 2 months	1 oz.	6 oz. 10%	to 20 oz.	3.00	6.20	1.00
2 to 4 months	1 oz.	7 oz. 10%	to 20 oz.	3.50	6.40	1.20
4 to 9 months	1 oz.	10 oz. 7%	to 20 oz.	3.50	7.25	1.75

AMOUNT OF FOOD AT EACH FEEDING.

Age.	Amount.	No. Daily Feedings.
1 week.....	½ to 1½ oz.	6 to 8
2 to 3 weeks.....	1½ to 3 oz.	10
4 to 5 weeks.....	2½ to 3½ oz.	10
6 to 9 weeks.....	3 to 4½ oz.	9 to 8
3 to 5 months....	4 to 5½ oz.	8 to 7
5 to 9 months....	5½ to 7 oz.	7 to 6
9 to 12 months...	7 to 9 oz.	6

FEEDING OF BABY.—Baby should have water in first few days; give 2 dr. of a 5 percent. sugar of milk solution whenever it seems to want water.

Modified Milk.—During first day baby should be given sugar water frequently, but no cow's milk. After ninth month gradually decrease diluent until plain milk is used. If a change is made from breast to modified milk begin with a lower formula than that of mother's milk, as cow's milk is not so easily digested.

Breast.—Put baby to breast every two to four hours during the day, and not at all or only once during the night. To dilute breast milk, follow nursing with sugar water, or alternate with nursing.

Bottle.—Nursing bottle should be so shaped that all parts of inside can be reached and cleaned with a stick. As soon as bottle is empty, rinse out with cold water, and once daily scrub with soap and water; also put bottle in cold water and boil for a half hour daily, then drain thoroughly.

Nipples.—Use plain or "anti-colic" nipple, attached directly to bottle; *never use a tube.* Nipple should be short, with the hole just large enough to allow water to drop through when nipple alone is filled. Boil nipple every day, and keep in fresh boric acid solution when not in use. To give sugar solution, use a small bottle and small nipple (a 2-dr. bottle with medicine dropper bulb is convenient size); best not use spoon.

STERILIZATION OF MILK.—Best "certified" milk need not be sterilized in winter time. "Scalding" of milk, as practiced in the tenement houses, is not bad—put on stove in pan and heat slowly for about 30 minutes until scum forms (this is nearly 155° F., which is about the right temperature). Milk should never be

boiled, as—1. Taste is bad. 2. Milk is dead, and not so good for baby.

Pasteurization.—Pasteur demonstrated that heating milk to 155° F. is enough to kill bacteria (sterilizing requires 212° F.). The Freeman sterilizer (to be obtained from Mr. Dougherty) is a convenient means for Pasteurizing, and insures uniform results; it maintains the milk, contained in the feeding bottles, at 155° F. for thirty minutes, when it is rapidly cooled. Milk thus treated should be used within twenty-four hours. Before feeding, place bottle in warm water.

Evidences of Agreement of Milk.—Several things may indicate whether or not baby is getting the proper food; weight and temperature are most important guides.

Weight.—Babies naturally lose weight during first few days after birth; a breast-fed baby usually regains its birth-weight within ten days, while it may require a month or more for the bottle-fed baby to regain original weight. Loss of weight during first week is about 8 to 10 ounces. Use scales every day, and thermometer every second day.

Temperature.—A primipara may have no milk for two or three days, and baby may run up temperature from inanition (starvation temperature). With insufficient food, the weight decreases at same time temperature rises; after giving proper amount of food, temperature reaches normal before weight. Rise in temperature and loss of weight show disagreement; begin with weaker milk, the strength depending on state of weakness of baby. Take temperature once a day.

Stools.—Character of the stools, combined with weight, is an important indication of agreement of food. Smooth, yellow stools with normal temperature and gain in weight, show that baby is doing well; curds in stools show too much proteids; vomiting and too frequent stools show excess of fat. Green stools show that liver is not functionating properly, and may be caused by any disturbance of mother.

Feeding of Premature Baby.—Incubator babies should usually be started on 1 percent. milk, giving 2 dr. hourly during the first week. If this milk does not seem to agree, stop food for

twelve to twenty-four hours, allowing stomach to rest; give barley water in mean time.

Artificial Foods.—All require much sugar to preserve them; hence they "make fat babies for good pictures, but very unhealthy babies who easily contract disease." If necessary, they may be used, in conjunction with fat, *for a short time only,* e. g., condensed milk on a long journey; but *never* use as a steady food.

Approximate Composition of Various Baby Foods.

Anomalies of Milk Secretion.—When quality of milk disagrees with baby, it is due to either fat or preteids. If the mother's milk is at fault it can be corrected; a meat diet will increase fat and proteids, while an excess of either can be reduced by a vegetable diet. Disagreement is most marked in the first month; after then, baby can take care of any irregularity in the milk.

Milk too Rich.—To dilute mother's milk when too rich for baby—1. Let mother have plenty of liquids. 2. Give baby from 2 dr. to 1 oz. of barley or sugar water after nursing from ten to fifteen minutes. 3. First milk is poor in fat and rich in proteids, last milk is the reverse; hence take first milk (5 oz.) with breast pump, then let baby nurse.

Impregnation During Lactation.—Stop nursing at once, as—

1. Milk is poor in quality and quantity. 2. Woman cannot nourish both baby and fetus. 3. Danger of miscarriage from reflex of nursing.

Menstruation During Lactation.—Best to have amenorrhea during lactation; menstruation does occur, but is exceptional. If woman's suffering is slight, there is little disturbance of milk and it is best to continue nursing, as danger of deranging child is less than from change of milk.

Nervous Impression.—Fright, grief, etc., of mother may cause derangement of baby through milk—probably due to increase in proteids; hence avoid all emotion. A placid disposition of mother of nurse is best; consider this in advising continuance of nursing. (Milk of cow is also changed by fright.)

Care of Breasts.—New and tender breasts are liable to have cracks in nipples; prevent their formation by the use of white vaselin or albolene, or a mild astringent, before confinement. If no milk is present in breast, do not allow baby to remain and chew nipple—do not leave longer than ten minutes at a time; but best to put baby to breast every four hours to get colostrum.

Cracked Nipples.—When cracks occur, apply silver nitrate, 8 percent. solution (40 gr. to 1 oz. water), over abrasions, then use nipple shield. Keep the nipple and baby's mouth clean, to avoid infection of abrasions. Nipples may be softened with a solution of five parts of borax to eight parts of 50 percent. alcohol.

Occlusion of Ducts.—Occluded ducts furnish good soil for bacteria; hence don't allow sagging of breasts, but support by binder, and use gentle massage if milk does not flow freely. To prevent infection, boil shield daily, and when not in use keep in boric acid solution made fresh every day.

Mastitis.—When breast becomes infected the symptoms are pronounced; there is a sudden rise of temperature, acute pain, rigor, and acute sensitiveness.

Treatment.—1. Empty the breast; before bacterial infection occurs, let baby empty breast; if it cannot, then massage the swollen quadrant toward nipple. Exercise great care in use of breast pump; put only over nipple, and avoid bruising of tissues. 2. Empty bowels by large doses of saline—2 to 3 oz. Rochelle salts,

or smaller doses taken every half hour; open the bowels *freely*. 3. Put on ice bag—nothing better to abort inflammation. Ice bag will blister if applied directly to skin; interpose towel or thick layer of gauze.

Treatment of Abscess.—If breast becomes infected, *do not put baby to nipple;* treat same as abscess elsewhere, by incision and drainage. Avoid disfiguring scar by confining the incision to either the areola or white skin, never extending it from one to the other. Glands of Montgomery may be incised inside the areola. Incision may be made underneath breast at periphery; if opening is to be near nipple, make incision in a radiating direction, to avoid transverse incision of ducts. Use *drainage tube* and aseptic absorptive dressing. Don't put baby back to breast until microscope shows absence of pus cells.

To Dry up Milk.—Best method is to apply firm pressure by well-fitting bandage, then leave alone. Apply a smooth fold of cotton over entire breasts and axillæ, leaving small holes for nipples; then apply breast binder, or figure-of-8 bandage, with holes for nipples; bandage may be renewed in two or three days. Move bowels freely with salines. Ice bag over breast may be necessary. Best not use breast pump, as any form of stimulation of nipples is bad.

PATHOLOGY OF THE NEW-BORN.

Congenital Syphilis.—May be inherited from either the father or mother, usually the father; if both parents have disease, baby does not suffer worse than if the father alone has it. A syphilitic woman becoming pregnant is more likely to abort than is a woman who contracts syphilis after becoming pregnant. Baby may contract syphilis during labor from lesions about vulva.

Mortality.—Mortality of babies born with syphilis is about 50 percent., while those that live are very feeble. If badly diseased, babies usually die inside of two weeks.

Symptoms.—Marked coryza, or "snuffles," like cold in head, only more persistent and pronounced. Skin of the palms and soles may be macerated and denuded; also skin about mouth and anus. Skin has serous discharge, and danger of infection

is very great. There may be bullous eruptions (pemphigus syphiliticus), leaving brown spots after healing. Later in the disease, the skin becomes scaly. May be "lineal ulcers" at muco-cutaneous junctions, lesions being more likely to occur where skin is thin and delicate. Spleen and liver are large, and there may be interstitial pneumonia.

Nursing—Let baby nurse, even if mother has not syphilis, as she is immune to it; but do not employ a healthy wet nurse, especially if baby has lesions in mouth, as the danger of infection is very great.

Danger of Infection.—Danger to other babies, nurses, etc., is very great, as from kissing, use of spoons, etc.; but danger is not so great as in primary stage.

Treatment.—Begin inunctions of blue ointment at once—10 gr. daily, to inner surface thighs, loins, axillæ, palms and soles, choosing a different location each day; it may be mixed with equal parts of a bland ointment. Internal treatment may be used when necessary to conceal nature of disease—gray powder, calomel, etc. Keep up nourishment, and get baby under treatment as rapidly as possible.

Incubator Babies.—Premature babies under 4½ lbs., poorly nourished babies over this weight, and babies with subnormal temperature, are best cared for in an incubator. Even 3 lb. babies may be saved.

Temperature in Incubator.—Incubator should be heated by tank of water, and should be kept at 80° to 90° F., usually near 90°. Bunser burner is preferable, but oil or alcohol may be used if without gas supply. Have thermometer through lid, or at side of baby.

Air Supply.—Have abundant air supply, and keep air moist by vessel with wet cotton. Have good current of air—collection of moisture on glass shows insufficient ventilation.

Clothing in Incubator.—Should be loose, to allow free movement and expansion of chest. 1. Abdominal band. 2. Short shirt. 3. Inner napkin, to collect the discharges. 4. Outer napkin, pinned over feet and folded up like a sleeping-bag. May have a third napkin between thighs.

Feeding.—The digestion is weak—too weak for breast milk.

Best use diluted breast milk, as modified milk is not so good; dilute with equal parts sugar solution, 5 or 6 percent. Give breast milk (or second-day modified milk) in "half strength, half amounts, and twice as often." Gradually work up to full breast milk; at first, putting to breast two or three times daily, and after a few days feeding, remove baby from incubator and keep on breast.

Substitute for Incubator.—Babies between incubator weight and 5 lbs. should be wrapped in cotton dress (cotton babies). Have gauze and cotton dress to fit body and arms, with separate pads for feet. This method supplies sufficient heat; (hot water bags are dangerous, as they may cause fever if too hot or too numerous). Receptacle for "cotton baby": Use bureau drawer, or clothes basket, with firm pillow to keep baby off of bottom; have near enough top to allow air to circulate freely over baby.

Atelectasis.—From imperfect lung expansion. During blue attacks, with feeble circulation and respiration, give oxygen for five minutes in each hour to supplement air supply.

Icterus Neonatorum.—Occurs in 33 percent of cases at Sloane. Usually appears on third to fifth day and lasts about ten days. It disturbs baby very little and requires no treatment.

Etiology.—Due to occlusion of bile ducts from pressure of enlarging blood vessels, the ducts being more or less congested. Physiological jaundice must be distinguished from the pathological variety which may be due to—1. Sepsis. 2. Syphilis. 3. Congenital malformation of bile ducts.

DYSTOCIA FROM MATERNAL CAUSES.

Anomalies in Expulsive Forces.

Normal Balance.—Normally the forces of labor are well balanced, but this balance is easily disturbed. There may be either an excess or deficiency in expulsive or resisting forces; in expulsive forces, the more common anomaly is a deficiency, while in resisting forces, an increase is more common. Normal labor means vertex presentation, with birth occurring in a reasonable time and without injury to mother or child; an equilibrium is necessary in all forces.

Inertia Uteri.—The most common cause of deficiency in the expulsive forces. A condition in which the uterine muscle is unable to overcome the normal resistance. May be due to—1. Faulty development from lack of exercise. 2. Uterus too weak to overcome resistance of cervix, in shop girls, etc. 3. Hyperæsthesia, causing inhibition of pains. 4. Lack of supplementary forces—abdominal inertia, from lack of tone, or overstretching from twins or polyhydramnios. 5. Malformation of uterus (bicornate, etc).

Misdirected Forces.—Caused by full bladder or rectum, prolapse, pendulous abdomen, etc. Pains may be frequent, but are not effective; woman is easily tired out—both muscular and nervous exhaustion; pulse is rapid. Treatment: Remove cause (full bladder or rectum), and treat as inertia uteri.

Results.—Woman is easily tired out, and becomes hysterical; pains are too short, and are ineffective—the cervix remaining undilated. Results are worse in primiparæ.

Treatment.—Rest for patient and physician, as both are tired out; give chloral by rectum, or hypodermatics of morphin; upon waking, give hot broth or warm food, and let resume. Prophylactic treatment should be instituted in last month of pregnancy—strychnin sulphate, 1-30 gr. t. i. d., combined with massage and exercise (walking) daily. At time of labor, give 1-30 gr. strychnin every two hours, alternating with quinin sulphate, 5 gr. every two hours, until four doses of each are taken. *Never use ergot until uterus is empty.*

Dilatation of Cervix.—Artificial dilatation may be necessary in cases of deficient expulsive forces. It is performed by means of elastic bags or graduated bougies, but best by use of fingers.

Elastic Bag Dilators.—Two forms are in use—1. Barnes, or fiddle-shape, bag. 2. The Champetier de Ribes bag, conical, with canvas lining (Voornees' modification). Both styles have four sizes in a set.

Method of using: Have everything aseptic, and precede introduction by lysol vaginal douche. If cervix is too small to admit bag, first use glove-stretcher dilator. Roll up bag, well lubricated, into as small compass as possible, and grasp with

holder; then pass it along fingers into cervix—a speculum, as a rule, is not needed. When the bag is in place, dilate with air or antiseptic solution (lysol is usually used), using a metallic or Davidson's syringe; when full, remove the syringe, and tie the tube (folded) with tape. Put tube into vagina, and cover vulva with sterile towel. Bag will usually stimulate contractions of uterus; if it does not, have the nurse exert gentle traction on tube every fifteen minutes.

Dangers: A large bag may derange presenting part, and cause prolapse of the cord; there is little danger with the two smaller sizes.

Fingers.—Dilatation alone, or combined with accouchment force after one hour. With a flattened cervix, dilatation is easy. Insert one finger, then two, then gently stretch; then one of each hand, one and two, two and two, etc. If version is to be done, don't attempt it until the cervix is sufficiently dilated to admit folded fist; begin with hand folded in shape of cone, then dilate by folding up fist in cervical canal. There is danger of laceration if done too hastily; hence take time, and use great care.

Results of Prolonged Labor.—Dangers to mother: 1. May cause necrosis from the prolonged pressure. 2. Exhaustion. 3. Postpartum hemorrhage. 4. Sepsis. Dangers to child: 1. Head may be injured. 2. Cord pressed upon. 3. Pressure on the circulation. 4. Inspiration pneumonia, from efforts to inspire in utero.

Anomalies in Resisting Forces.

Deficiency in Resisting Forces.—Must be combined with good uterine contractions. A very unusual condition, resulting in precipitate labor. Is not common in primigravidæ, and is usually due to small child.

Dangers.—Principally to child, as it may be born anywhere: 1. Cord may snap if too short. 2. The head may be crushed by striking floor. 3. Water closet may be receptacle for baby. Dangers to mother, from sudden emptying of uterus: 1. Postpartum hemorrhage, and syncope. 2. Lacerations. 3. There may be inversion of uterus.

Treatment.—If woman has had one experience, advise her to

go to bed at beginning of labor, and use chloroform to retard expulsion of child.

Excess in Resisting Forces.—Mainly due to the deformities of bony parts. Common in America, occurring mainly in blacks (in Baltimore, about equally in both races); 13 percent. of both races have deformed pelves while it is found in 6 percent. of white women and 18 percent. of colored. However, more blacks have spontaneous labors, owing to smaller size of fetal head. The character of deformities differs in the two races, rachitis being more common in the colored race, due to poor hygiene.

Causes of Pelvic Deformity.—1. From faulty development: Due to disturbances which cause changes in nutrition; the bones assume abnormal shapes from—(a) natural expansion; (b) traction of muscles; (c) pressure of the trunk downward, through the spinal column; (d) pressume from below, through thighs. 2. From disease (most commonly rachitis). 3. From traumatism.

Direction of Deformity.—1. Antero-posterior contraction (flat). 2. Oblique contraction (Naegele). 3. Transverse contraction (Roberts). 4. General contraction (justominor).

Deformities of the Pelvis.

A. Faulty development	1. Simple flat. 2. Justominor (generally equally contracted). 3. Flat, generally contracted (justominor flat). 4. Narrow, funnel-shape (masculine). 5. Obliquely contracted (Naegele). 6. Double obliquely contracted (Roberts). 7. Justomajor (generally equally enlarged). 8. Split pelvis.
B. From disease.....	1. Rachitis. 2. Osteomalacia. 3. New growths of bone. 4. Fractures. 5. Caries and necrosis.
C. Anomalies in union	1. Abnormally firm joints (synostosis). 2. Abnormally loose joints.

Simple Flat Pelvis.—One of the most common deformities in white race. The oblique and transverse measurements are practically normal, while the conjugate is diminished, due to throwing forward of sacrum as a whole; the external conjugate is also diminished. The pelvis is symmetrical, and deformity is not noticed on inspection.

Etiology.—A congenital condition as a rule; may be due to faulty development in girls with poor hygienic surroundings and subject to hard work.

Influence on Labor.—Head of child is generally in transverse diameter—most commonly L. O.; this is longest diameter, the head, due to forward position of promontory. First stage is usually prolonged; but after head passes promontory, the labor progresses normally unless woman is exhausted. Anterion fontanelle is felt presenting. Prolapse of cord is common, due to delayed engagement. Promontory causes a depression on posterior parietal bone, near anterior fontanelle and parieto-frontal suture. The anterior partietal bone may catch on symphysis, causing reversed obliquityof head; this is rare.

Justominor Pelvis.—The most common deformity in the colored race. Contraction in all directions; external oblique measuring 20 cm. or below. The sacrum is small, but relatively farther back than normal, there being a relative increase in both internal and external conjugates.

Influence on Labor.—Head takes the normal oblique position. There is extreme flexion, marked moulding, and labor is prolonged. The posterior fontanelle is easily felt, while anterior is not felt, due to marked flexion; the overlapping of bones can be felt. Strong pains and prolonged labor are necessary to force head through the narrow canal, but latter part of labor is normal. Prolapse of cord is not common.

Justominor Flat Pelvis.—This is a combination of simple flat and justominor, there being less space at sides than in the flat.

Influence on Labor.—Labor is very difficult, and version is less favorable than in simple flat. It combines difficulties of both flat and justominor; the head usually becomes firmly impacted, and child is lost.

Narrow, Funnel-Shape Pelvis.—Best example is the male pelvis; there is plenty of room at brim, the measurements being about normal; while outlet is narrow, the tuberosities being close together and coccyx projecting forward. Symphysis is deep and

the angle acute. This form may be associated with deformities of spinal column.

Influence on Labor.—First stage of labor is normal, the child easily entering inlet; but difficulty arises when head reaches outlet, and necrosis may result from the prolonged pressure. The child being mainly in lower zone and pelvis, the uterus works at a disadvantage—the upper segment thickens and the lower thins, the common result being rupture. Version, forceps, or Cesarean section must be prepared for.

Obliquely Contracted Pelvis.—An uncommon deformity, first described by Naegele in 1834, and bearing his name. Pelvis is asymmetrical, the symphysis being toward healthy side. One side is thrown upward and inward, while the healthy side is thrown upward and outward, due to the pressure of femurs. Ischial spine of diseased side approaches sacrum, projecting into cavity. One oblique, measured from the diseased side in front to healthy side behind, is shortened; while the opposite oblique is increased.

Etiology.—Due to the absence of bony nuclei in one ala of sacrum, lateral process remaining undeveloped. Deformity is noticed in infant, and it increases after child begins to walk; ankylosis later takes place, from friction and inflammation in sacro-iliac articulation.

Influence on Labor.—Head can only descend in one diameter —the oblique measured from diseased side behind to healthy side in front. There is marked moulding, and faulty rotation at outlet, if head be of normal size. Symphysiotomy is not indicated, owing to ankylosis. If seen early, induction of labor and version may be performed; if rupture of uterus has occurred, use forceps, or perform Cesarean.

Double Obliquely Contracted Pelvis.—The rarest of all pelvic deformities; first described by Roberts in 1842. Is the result of maldevelopment, and ankylosis of both sacro-iliac joints; both sides being flattened.

Influence on Labor.—The difficulties are those of the Naegele pelvis doubled, the delivery of child being almost impossible. Cesarean section is the only treatment.

JUSTOMAJOR PELVIS.—When external oblique is 24 cm. or above. Generally causes no trouble unless woman is walking about at time of labor, hence put to bed near time of confinement.

Influence on Labor.—There is danger of laceration, syncope, and postpartum hemorrhage from precipitate labor. Let the woman recline at onset of labor, and keep her from straining; use chloroform and restrain head.

SPLIT PELVIS.—A rare condition, due to lack of development of symphysis; there is usually a fault in abdominal wall, and extrophy of the bladder.

Influence on Labor.—Only seven cases of pregnancy recorded. Labor is not difficult; there is danger of precipitate labor, prolapse of uterus, etc.

RACHITIC PELVIS.—Most common deformity from disease. In normal development of bone, there are two processes—the growth of bone on the exterior, and absorption of bone on the interior; in rachitis, both processes go on more rapidly than normal, there being a rapid proliferation of bone cells but a deficiency in deposit of lime salts; hence the bones are soft and easily deformed.

Etiology.—It occurs early in life, while the bones are in the cartilaginous state, the deformities resulting from pressure, mainly after the child begins to walk. It results from poor hygiene, and poor and deficient food.

Deformity.—Simple flat, justominor, and justominor flat may result from rachitic deformities. The seat of deformity is most commonly at sacro-iliac synchondrosis. The sacrum is rotated forward—not moved forward as a whole, as in simple flat; the erectores spinæ tend to draw middle part of sacrum upward and backward, while sacro-sciatic ligaments tend to hold coccyx forward; hence curve of sacrum, with concavity forward. The sacrum is narrow, and convex from side to side anteriorly. The posterior superior spines are thrown downward and inward, while the anterior superior spines are thrown forward and outward; hence the distance between spines is greater than between crests. The natural outline of pelvic brim is changed—there is a sharp curve in lateral wall, just anterior to synchondrosis; the symphysis is

drawn backward and depressed, due to throwing outward of the ilia and the pulling of Poupart's ligament; result is a "figure-of-8"-shape inlet. Transverse diameter is widened above and narrowed below, while the conjugate is narrowed both above and below. The acetabula are closer together and nearer the front, from exaggerated curvature of innominate bones. The deformity may end as a justominor, flat or justominor flat pelvis if the disease is cured before child walks; while if disease continues later, deformity is caused by walking, carrying weights, etc., and may resemble the osteomalacic pelvis (pseudo-osteomalacia).

Diagnosis.—The woman is short and small, the legs being short and thick, and curved forward. The head is large and square; nose is flat, and forehead is low and broad. She is chicken-breasted (pectus carinatum), and the joints are large. History shows that woman did not walk until three or four years old, and was late in getting teeth. While pregnant, she has pendulous abdomen. Pelvimeter shows diameter between spines to be equal or greater than crests; vaginal examination (also by pelvimeter) shows narrowed conjugate.

Influence on Labor.—With head in brim, the deformity has all the disadvantages of simple flat, only worse; the head is transverse, and lateral obliquity and rotation is increased. Head usually goes more easily after passing brim, owing to curve of sacrum.

Osteomalacia.—Rare in United States, but common in Italy, etc. It develops, as a rule, during pregnancy and lactation, and consists in a general softening of bones once hard, the bones becoming very pliable. The inlet may be almost completely shut off by deformity, while the outlet is narrowed. The brim becomes beak-shape, with apex to front. Woman complains of pain on pressure and from walking.

Diagnosis.—Bones are soft, and there is marked beak-shaped deformity. Woman's height is diminished, may be 1½ ft. shorter during pregnancy. Spinal column is sunk into pelvis, and she has a swinging gait, from approximation of thighs.

Influence on Labor.—If deformity is marked, Cesarean section must be performed; remove uterus and ovaries, as destruction of sexual function cures the disease.

New Growths.—Generally exostoses, occurring at pectineal eminence, pubic rami, or sacro-iliac synchondrosis. They may obstruct canal, but greater danger is from sharp projection causing injury to child. Fibrous and other tumors may also occur. Treatment is Cesarean section if disease is marked.

Fractures.—Not commonly met with in labor, as mortality is high; they may be found if in the anterior portion of pelvis. Deformity may result from—1. Malposition of the fragments. 2. Formation of callus. 3. Ankylosis of joints. Deformity is less marked if fracture has occurred in the anterior portion; if behind, result is practically a Naegele pelvis.

Caries.—Tuberculosis is most common cause. It generally occurs at the sacro-iliac snychondrosis, resulting in oblique contraction (Naegele).

Synostosis.—Abnormally firm joints may occur at symphysis pubis, sacro-iliac and sacro-coccygeal articulations. If in front, it is not noticed unless it offers obstruction to knife in symphysiotomy, as normal mobility is not noticed; if behind, there is usually a lack of development (Naegele or Roberts). Ankylosis of coccyx to sacrum is common, and most important; it is due to falls on buttocks. The angle is abnormally acute, from union in abnormal position; it may be overcome in labor by fracture, from action of Nature or by forceps.

Abnormally Loose Joints.—May be exaggeration of normal condition during pregnancy, or may be due to suppurative disease of joints. Relaxation predisposes to rupture. Causes difficulty and pain in walking, or on moving joints. Patient may be made more comfortable by firm bandage; the trouble subsides after delivery.

Diseases and Deformities of Spinal Column.

Spondylolisthesis.—The third, and sometimes fifth to seventh lumbar vertebræ roll down and lie in pelvis upon the sacrum; only the bodies, however, come into the pelvis, the spines and laminæ being thinned and stretched. It develops most commonly in childhood, but may become worse during adult life. Fracture may occur from lack of development—the bones being thin and delicate.

Deformity.—Pressure is downward and backward, resulting in backward rotation of the sacrum; projection forward of the vertebral bodies tends to flatten inlet, while throwing forward of apex of sacrum results in flattening of outlet. The sacral spines are prominent, while the trochanteric regions and buttocks are flattened. Bony ankylosis may occur between the lumbar vertebræ and sacrum.

Diagnosis.—The woman is shortened; the vertebral column rolls forward, and she feels as if falling forward; hence the shoulders are thrown backward, and it is impossible to carry any weight in front. In walking, woman has a swinging gait, placing one foot on line with and in front of the other. The ribs seem to have settled down into a broadened pelvis.

Influence on Labor.—The mechanism of labor is similar to that with simple flat, behavior of child being about the same. The "working conjugate" is measured from vertebra instead of sacrum. Head is transverse, with marked lateral flexion; rotation is normal, the head having easy advance after passing the false promontory.

Kyphosis.—"Hump-back." More common than spondylolisthesis. Pelvis is funnel-shape, due to irregular pressure from above. "Do you see that hump?"—it means sacrum is thrown forward, the amount depending on size and nature of the hump. There is a compensatory lordosis; the vertebral column being bent forward below, pushing the base of sacrum back, and tilting the apex forward; hence pelvis is large at brim and small at outlet.

Influence on Labor.—Not every kyphotic pelvis necessitates Cesarean. Difficulty usually increases with each labor; there is rupture of uterus if head can't pass obstruction. Pregnant uterus is prominent, and abdomen is pendulous, due to short stature and pelvic deformity. Head usually engages readily, but trouble is experienced at outlet. If transverse diameter is 8.5 cm. or above, not much trouble will be experienced; if 6 cm. or below, Cesarean is necessary; if between 6 cm. and 8 cm., other means may be used.

Lordosis.—A bending forward of spinal column. Usually

complicates some other deformity, as kyphosis, spondylolisthesis, etc. It is mainly symptomatic.

Scoliosis.—Lateral curvature of spinal column. The greatest pressure from below will be upon the side toward which the lumbar vertebræ are bent, and this results in lateral flattening of pelvis. This condition is generally combined with rachitis. Deformity may be marked in school girls, from working at desk; while in boys, it is less marked, owing to a greater amount of exercise. If combined with rachitis, a living child cannot be born.

Results of Pelvic Contractions.

Dangers to Mother.—When pelvis is contracted at the brim, the abdomen is usually pendulous; the head fails to engage, and is directed into iliac fossa or in front of the symphysis, resulting in—1. Prolapse of cord, as the head does not fill up brim. 2. Membranes extend through cervix in a finger-shape process, contractions of uterus cause their rupture and early escape of liquor amnii; the result is a dry labor, with marked pressure on mother and baby, followed by sloughing of the maternal structures; before time of forceps, fistulæ were common. Labor is tedious, and the woman becomes exhausted; there is lack of contraction of uterus after delivery, with hemorrhage, and sepsis from pressure and retained blood clots. 3. Uterus may become incarcerated by being caught under contracted brim. The difficulty increases with each successive confinement up to thirty-fifth year. If pelvis will not admit head, uterus will be ruptured; if uterus is weak and abdominal muscles are lax, child cannot be delivered without forceps.

Dangers to Child.—1. Prolapse of cord. 2. Pressure on the placenta, shutting off the blood supply and causing asphyxia, or reflex inspiration and pneumonia. 3. Pressure on soft parts of head, causing necrosis. 4. Intracranial hemorrhage. 5. Injury from forceps, if not used early.

Management of Labor.—Method of delivery depends on the degree of deformity; may be left to Nature, or may require forceps, version, induction of labor, etc. 1. If conjugate is more than 9.5 cm., delivery will be normal. 2. With conjugate

between 9.5 cm. and 9 cm., with previous abnormal labor, (a) induce labor about two weeks before term and perform version, or (b) if head is engaged, use forceps. 3. Between 9 cm. and 8 cm., perform version. 4. Between 8 cm. and 7 cm., induction of premature labor, as no living term child can be born; forceps may be tried, but case may demand Cesarean section or symphysiotomy. 5. Below 7 cm., perform Cesarean section. Cesarean section is probably best even above 7 cm.; in flat pelvis as high as 8.5 cm., and in justominor, 9 cm. 6. Below 6.5 cm. Cesarean section is necessary even with dead child. Craniotomy is practically always limited to cases where child is dead. Study the relative sizes of head and passage.

Aids to Delivery.—1. Moulding of head, and flexion. 2. Enlargement of canal. 3. Walcher position.

Walcher Posture.—With woman on back, pelvic brim makes an angle of 30° with horizon; with thighs flexed (lithotomy position), 40°. In Welcher position, brim makes an angle of 10° to 15°. Method: The woman is placed on table in dorsal prone position, with buttocks on edge of table and the legs dropped; this causes an increase in conjugate of .5 cm. to 1 cm., by rotation of pelvis around an axis passing through sacroiliac synchondrosis. This aids in engagement of head, and throughout the whole delivery. This position is best for use of forceps, but is inconvenient; hence best to combine it with Trendelenburg posture, by using a chair without round between back legs. In Walcher posture, abdominal muscles are made tense, and this also aids in delivery.

Dystocia from Anomalies of Soft Parts.

A. Dystocia from anomalies in uterine development.

B. Dystocia from cervix
   1. Atresia.
   2. Cicatrices.
   3. Rigidity.
   4. Septa.

C. Dystocia from vagina or vulva
   1. Congenital stenosis
   2. Cicatrices.
   3. Septa.
   4. Tumors.

D. Dystocia from uterine position or shape.

E. Dystocia from tumors
   1. Uterine.
   2. Ovarian.

F. Dystocia from displaced kidney.

Uterine Development.—In a double, or septate uterus, one side may be pregnant, the other side blocking the delivery. 1. The contraction may be interfered with by attachment of placenta to the septum, resulting in postpartum hemorrhage. 2. Septum may rupture. 3. Retention of placenta or membranes, from insufficient contraction, may result in sepsis. 4. Septum may block way of forceps, or forceps may include septum in grasp.

Cervix.—The cervix may obstruct labor by reason of atresia, cicatrices, rigidity, or longitudinal or transverse septa.

Atresia.—Occlusion, from inflammation of cervix. There is no dilatation until os is opened. A dimple may mark site of external os. Indication: Make opening with sterile probe or finger nail, or by a crucial incision with scissors; after an opening has been made, dilatation is rapid.

Cicatrices.—Common in multiparæ, resulting from lacerations during former delivery, use of caustics, trachelorraphy, syphilis, malignant disease, etc. Indication: Cesarean section in all malignant cases; in non-malignant cases use—1. Glove-stretcher dilator. 2. Elastic bags. 3. Fingers. Dilate gradually, using one or more methods. A hot vaginal douche may favor dilatation. Use chloral to give rest before mechanical dilatation.

Rigidity.—Common especially in "hot-house" primiparæ. Give hot vaginal douche, and chloral by rectum, and let woman rest if tired. Use same treatment as for cicatrices, first glove-stretcher, then bag or fingers.

Septa.—Due to faulty development—from fault in fusion of Muller's ducts. Bands of tissue extend across the canal, usually in longitudinal direction with antero-posterior attachment. Indication: If it cannot be slipped past head, cut the band, as there is usually no hemorrhage; or cut between two ligatures.

Vagina or Vulva.—Labor may be obstructed by anomalies of the lower birth canal, either congenital malformations, or abnormalities due to disease.

Congenital Stenosis of Vagina.—Usually in upper third. The woman usually delivers herself, as tissues soften and dilate similarly to atresia of cervix; if not, use fingers to dilate.

Cicatrices.—Result from lacerations, use of caustics, etc. If benign, use fingers or bags to dilate, as in cicatrices of cervix;

if cancerous in origin, perform Cesarean.

Septa.—From faulty development. Usually soft, and can be pushed past head; if not, cut between ligatures.

Tumors.—1. Cyst of Gartner's duct may obstruct labor; puncture cyst, deliver child, then attend to tumor. 2. If a cancerous tumor obstruct passage, perform Cesarean section. 3. Hematomata are most common, resulting from rupture of varices and effusion of blood into labia; bluish in color, and feel like soft snow ball. If obstructing labor, incise at muco-cutaneous junction, turn out clot, and pack with gauze—amount of packing to be less than that of clot, and to be changed often; not necessary to catch bleeding points, as hemorrhage can be controlled by pressure.

Uterine Position or Shape.—The uterus may be displaced forward, backward, downward, or to either side; may be twisted on the cervix, or form part of contents of a hernial sac.

Anterior Displacement.—Due to a pendulous abdomen—the result of kyphosis, or laxity of muscles from multiple pregnancy, etc. The direction of uterine force is upward and backward, driving child against vertebral column. Treatment: Keep woman on back during labor, and apply an abdominal bandage; or stand by and hold fundus up until head engages.

Sacculation.—May result from retro-version with fixation, or an improperly done ventro-fixation. 1. In posterior fixation, the anterior wall distends, cervix being up under symphysis. Treatment: Open abdomen and break up adhesions, if discovered in early months. 2. In anterior fixation, the posterior wall distends, the cervix points back, and anterior thickened wall may obstruct labor. Treatment: If discovered in early pregnancy, separate adhesions, or dilate cervix and empty uterus. In either case, if not found early, let go to term and perform Cesarean, as there is danger of rupturing thin wall of uterus if woman goes into labor.

Uterine Tumors.—Fibromata, or fibro-myomata, are the most common, their size and position determining the degree of dystocia. The subperitoneal variety is most likely to cause obstruction, while the intersitial and submucous tumors are most apt to cause hemorrhage; a pediculated submucous or subserous

tumor, low down in uterus, is also apt to obstruct passage, and long pressure on head and soft parts of canal may cause necrosis. There is a tendency to postpartum hemorrhage, retention of membranes, and sepsis; while with the interstitial variety, there is poor contraction, with long labor, hemorrhage, infection, etc.

Treatment.—1. If found early, and with signs of impending danger, best to remove tumor; if small, pregnancy may not be interfered with. Myomotomy may be done in favorable cases. 2. If woman has had previous dystocia, and tumor has increased in size during pregnancy, it is justifiable to empty uterus in early weeks rather than do Cesarean later. 3. In severe cases, best to remove uterus and child. 4. If woman has gone on to term, first see what she can do alone, as many women (especially colored) go through labor safely with numerous "knobs and bobs." If advance of the head is found blocked by tumor after several hours, put patient in knee-chest position, and try to push tumor out of way; if a small fibroid, try to enucleate, and pack; if obstruction is bad, best to perform Cesarean, with or without removal of uterus. In any case, prepare for postpartum hemorrhage.

Ovarian Tumors.—Ovarian cysts are most common, and are usually found in early months; if not removed until later, they may get low down in pelvis and obstruct passage. If large (size of cocoanut), and found in early pregnancy, they should be removed, as only 20 percent. abort from operation; if not discovered until time of labor, treatment is same as for uterine tumors. In case of a fluctuating tumor during labor (and especially if of the intraligamentous variety), an obstructing cyst may, in an emergency, be tapped aseptically, and treated after birth of child; but tapping is most objectionable in the dermoid variety, as fluid is too thick to aspirate, and leakage is liable. If prepared for it, abdominal section is best—either removing cyst and allowing labor to progress normally, or Cesarean section. With normal delivery or child, danger is not over, as the pedicle may become twisted from relief of pressure, necessitating operation.

Displaced Kidney.—May be congenital; if so, there is usually

but one, hence investigate before removing. Cyst of ureter may result from pressure. Kidney may be removed through vagina, but better to perform Cesarean section.

NON-CUTTING OPERATIONS FOR DYSTOCIA.

Induction of Labor.

Induction of Abortion.—The artificial production of labor at any time between seventh month, and before viability of child. Life of child is disregarded.

Indications.—Justifiable when either the mother or child is in danger. 1. On part of child: Usually some abnormality of the membranes, as (a) acute polyhydramnios; (b) cystic degeneration of chorion; (c) accidental hemorrhage, or (d) placenta previa; (e) fetal death from any cause. 2. On part of mother: The two most common indications are (a) pernicious vomiting and (b) threatened eclampsia; less common indications are (c) toxemia; (d) albuminuria; (e) pronounced and steadily increasing disease of heart or lungs; (f) chorea; (g) pernicious anemia; (h) mania, (i) melancholia, and (j) any condition which may necessitate Cesarean section, as tumors, deformities, etc.

Methods.—Use of drugs, vaginal tampons, electricity, etc., has been abandoned, as they are too slow, and are inefficient and dangerous. The two methods now used (choice depending on age of pregnancy and condition of cervix) are—1. The mechanical dilatation or cervix and emptying of uterus with fingers and forceps. 2. Same as the above, but preceded by preliminary softening and dilatation of cervix. First method is indicated when gestation is not past second month, while between third and fifth month choice of method must be made from circumstances.

Operation.—Have everything sterile. Dilate the cervix with glove-stretcher sufficiently, if possible, to admit middle finger. If gestation is six weeks or under, use dull curette and forceps (sponge holder) to empty uterus; first make a sweep around uterine cavity with finger or curette to separate membranes, then remove ovum and irrigate; feel for secundines, and pack if bleeding. This may be done at single sitting up to second

month, but be careful about advising single sitting from the second to fifth month. If done at more than one sitting, first pack the cervix, up to membranes, and vagina with iodoform gauze, and leave for ten or twelve hours; then dilate, and empty by using one or two fingers.

Induction of Premature Labor.—Emptying of uterus after the seventh month, and after viability of child. Interests of both mother and child are considered.

Indications.—1. On part of child; (a) Large and prematurely ossified head, with no moulding; (b) habitual death at certain time (induce labor before this time); (c) fetal death. 2. On part of mother: (a) Contracted or deformed canal (judge time from the biparietal diameter at various months—seventh month, 7 cm.; eighth month, 8 cm.; ninth month, 9.25 cm.); (b) tumors; (c) placenta previa; (d) toxemia and eclampsia; (e) chorea; (f) mania and melancholia, (g) pernicious vomiting (toxemia), and (h) any grave systemic disease. Do not perform the induction of labor without aid of consultant.

Methods.—Drugs are no longer used; the methods now in use are—1. Puncture of membranes. 2. Packing vagina with gauze. 3. Injection of glycerin. 4. Introduction of bougie. 5. Mechanical dilatation.

Puncture of Membranes.—A slow and dangerous method. It results in a dry labor, which is tedious and bad for mother and child.

Tamponing of Vagina.—Also a slow method, and uncertain, but probably safe if strict asepsis is observed. It softens and dilates cervix, and hence is generally combined with other methods.

Injection of Glycerine.—Introduced by Pelzer, of Germany. A small amount (1 or 2 oz.) of glycerin is injected between the membranes and uterine wall. Usually rapid, but not without danger, as may cause bloody urine, etc. Action: 1. Irritant to mucous membrane. 2. Mechanical separation of the membranes. 3. Draws water from tissues by hygroscopic action, and reflexly causes contraction. Method: Observe strict asepsis; attach catheter to glass funnel, fill the catheter with fluid and insert, on left side, between membranes and uterine wall, inject-

ing the glycerin by gravity; withdraw tube, and if necessary, put tampon against cervix. It may produce hematuria, which is bad in eclampsia.

Introduction of Bougie.—Best and quickest method and is to be preferred in private practice; it may be combined with puncture of membranes and tamponing. Krause's method is used: Use a stiff, silk bougie, and not a catheter, as the eye is dangerous; it is better to sterilize by heat. Have the parts thoroughly aseptic, and pass bougie along two fingers into cervix; if obstruction is met, change position. Introduce all but two or three inches, bend this upon itself in vagina, and hold in place by a gauze vaginal tampon. Introduce about nine o'clock in evening, and labor will generally begin next morning. Do not leave in over 24 hours; if labor has not then begun bougie may be again introduced. There is danger of rupturing membranes, thus causing dry labor.

Mechanical Dilatation.—If the use of bougie does not cause dilatation of cervix within twelve hours, introduce one or two fresh bougies, or dilate with elastic bag. Leave until labor is well advanced; if dilatation is delayed, exert traction every fifteen minutes. In case of emergency, soften cervix with a bag or tampon in vagina, dilate with fingers or glove-stretcher, and deliver with forceps.

Forceps.

History.—Invented by William Chamberlen, a Huguenot physician, who moved to England in 1569; he had a large family, two sons, both named Peter, being physicians. The invention was held in the Chamberlen family as a secret for several generations, descending to Peter the Third, whose son, Hugh, also a physician, tried to dispose of it in Paris. After losing a test case in Paris (a deformed dwarf), he went to Amsterdam, where he sold the invention to the College of Physicians or Amsterdam. The secret was later published by two philanthropic students, but the instrument as made public was probably a vectis. The original Chamberlen instrument was very crude, and had only the cephalic curve; Smellie, in England, and Levret, in France, added the pelvic curve, while Simpson, in Edinburg, and Hodge, in this country, patterned the modern instrument after

these. The shoulders to handles were added by Busch, in Germany.

Varieties.—There are at present many varieties of forceps, which may be classified under four different types:

Elliot Forceps.—Largely used, has fenestrated blades and a long and smooth shank, with a screw between the handles to determine distance between blades. The screw is dangerous, however, as it is difficult to keep clean; otherwise, this is a good forceps.

Simpson Forceps.—Patterned after Smellie's; a short forceps, with fenestrated blades, and shoulder on proximal and distal ends of handles. Distal shoulder is a disadvantage, as it may stretch vulva.

McLane Forceps.—(Tucker-McLane). Has solid blades, and a long shank (length of Elliot forceps). The chief objection (mainly theoretical), is that the solid slip more easily than the fenestrated blades; but as head is held by the shape more than by pressure of blades, there is seldom any slipping with McLane intrument. If labor is difficult, and grooves have been made in head by blades, slipping may occur; hence it is well to have two pairs, both solid and fenestrated. In introduction and removal, the solid blades have advantage, as there are no fenestræ to catch on ears, etc.; they are also better for rotating in pelvis, which is now more practiced than formerly. Its three chief advantages are—1. Ease of introduction. 2. Ease of rotation. 3. Ease of withdrawal; if fenestrated blades are applied for some time, they may be difficult to withdraw from catching of tissues in fenestræ.

Axis-Traction Forceps.—The Tarnier instrument is best. It is invaluable if much obstetrical work is done. It has a pulling rod and handle with universal joint, which keeps the direction of force always in line of pelvic axis, regardless of location of head in canal; simply keep rod parallel with the handles, letting forceps descend and rotate as it will. It is an expensive and complicated instrument, and does not have universal use, hence two are required. For use in emergency, it is good to have one at hand.

Characters of Forceps.—The three types of forceps, long,

short, and axis-traction, have different uses and applications: 1. Short (examples being Chamberlen and Smellie), are of use only when head is at outlet; they are generally without pelvic curve, and are little used at present day, as long type answers purpose. 2. Long, has both the pelvic and cephalic curve, and is the best and most useful all-round type. 3. Axis-traction, requires some experience in using, but is a great advantage, no force being lost as when pulling on the handles alone.

Selection of Forceps.—A forceps should fill certain requirements in blades, shank, handles, and lock: 1. The distance between tips of blades should not be less than 1 in. to 1⅛ in.; all forceps vary somewhat. 2. Distance between blades at concavity, 3¾ in. 3. Width of blade, 1½ in. 4. Bow of blade, 6½ in. long. 5. Shank of little consequence. 6. Shoulders rounded, with no sharp edges. 7. Lock, English is probably best, cleanest, and easiest of adjustment; French is the most secure, and is necessary on axis-traction forceps.

Indications for Use of Forceps.—1. When expulsive forces are insufficient to overcome the resistance. 2. When speed of delivery is necessary for safety of mother or child.

Contra-Indications.—1. Disproportion between child and canal—impossible delivery from abnormal size of child or canal. 2. Impossible delivery from position or presentation, e. g., transverse. 3. Undilated cervix. 4. Non-rupture of the membranes.

Dangers from Use of Forceps.—1. Compression of fetal head. 2. Laceration of maternal structures. 3. Fracture of skull.

The Operation in General.—As a rule, forceps should not be applied until woman has been in labor at least two hours; but if there has been no advance for one hour, they may be used if case is suitable, or even sooner if child's heart is bad, or if passing meconium or showing other signs of pressure.

Varieties.—1. High forceps, when head is at brim; a grave operation. If head is movable at brim, do version; if engaged, use forceps, or do version if uterus is not firmly contracted. 2. Medium forceps, when head is in cavity of pelvis. 3. Low forceps, when head is at outlet.

Position of Woman.—Always have patient in the dorsal prone position. Have bladder empty to avoid pressure, and have everything sterile.

Stages of Operation.—Usually divided into four stages (sometimes three): 1. Introduction. 2. Locking. 3. Traction. 4. Removal.

Introduction and Application.—Posterior and lateral introduction with pelvic and cephalic application.

Posterior introduction: The blades go in behind, and are then rotated to the desired position; the left blade is usually introduced first with right hand, passing it along fingers of left hand (either may be used); then introduce right blade along concavity of left, and rotate both inward until they can be locked.

Lateral introduction: One blade introduced on each side; introduce fingers up to cervix, then pass left blade into cervix with blade in direction of canal, using left hand; have nurse hold in position, and introduce right blade with right hand along fingers of left hand. ("Right" and "left" blade refers to handles as forceps lays on table with concavity of spoons turned upward; the right is the "male" blade, the left the "female" blade. Right and left blades go to respective sides of pelvis.)

Pelvic application: Considers only the pelvis, the blades catching head regardless of direction; usually practiced in England.

Cephalic application: Considers position of fetal head and disregards pelvis; is mainly used on the Continent.

Combined posterior and lateral introduction, with cephalic application: If position is L. O. P., the first blade (left) is introduced posteriorly; this usually starts rotation, and blade is rotated to side; then second blade is introduced laterally. If position is R. O. P., the right blade is introduced first and rotated; then left blade is introduced laterally.

Choice of application: In beginning the use of forceps, pelvic application is always safer; it is not wise to practice forceps rotation until experienced in commoner operations. If head is above brim, pelvic application is the only safe one, and

should always be used until sure each time of position of head. Cephalic application is of advantage when position of head is known, and blades can be rotated to bring to sides of the head.

Locking.—Never use traction until the blades are locked, as injury to head is liable. Handles should be as close together, when locked, as they will come with gentle pressure. The distance between handles, when closed, will show nature of grasp—whether biparietal or fronto-occipital. Loosen blades frequently to prevent stopping circulation in parts compressed.

Traction.—The functions of forceps are—1. Traction. 2. Compression. 3. Leverage, or rotation. Traction is the most desirable, compression the least desirable; but traction itself brings about compression.

Special Operations.—Have the patient and all instruments as sterile as for any cutting operation; boil the blades in lysol solution. Always catheterize before beginning operation.

L. O. A.—With insufficient expulsive forces, and disproportion between head and canal: Use lateral introduction, with pelvic application; exert tentative traction, pulling gently to see if head moves. Pull in direction of that part of canal at which the head is engaged, i. e., backward at inlet, forward at outlet, etc., separating the blades every few moments. Use chloroform to apply the blades, and it is best to keep up full anæsthesia until operation is finished to avoid accident should woman regain partial consciousness (one case of rupture of uterus from woman rising up, then sitting down on forceps); but if plenty of help is at hand, let woman become partially conscious so she can aid; then "pull when she pushes." Up to this time have the woman in lithotomy position, with leg-holders applied; when head is almost out, remove holders, having nurse hold legs, and secure chin with flexed middle finger. When head can be controlled, gently remove forceps, having nurse hold fundus.

Head in Abnormal Position.—Use the combined introduction, with pelvic application (have considerable experience with forceps before using direct rotation). Disregard position of head, pull gently, and unlock occasionally to allow Nature to rotate. When forceps become antero-posterior, remove the

blades and reapply at sides of head, at same time holding the fundus to prevent displacement of head.

Use of axis-traction forceps: The above applies to ordinary forceps; with axis-traction, the manner of introducing is the same—first right, then the left blade, and then locking; the traction rods are then snapped on, and the handle adjusted. Approximate blades by means of set screw, or towel wrapped around handles. *Pull with traction rod parallel with handles.* Universal joint in handle allows for rotation, hence the axis-traction is best for high forceps, requiring less skill in its use.

Persistent O. P.—Labor is tedious, head is poorly flexed, and woman is easily exhausted. Except when head is on floor of pelvis, pelvic application is safer. Always best to bring to O. A. before head is born; to obtain this, try manual means before using forceps rotation.

Forceps rotation: A persistent O. P. is very bad, as extensive lacerations are common; but attempt forceps rotation only after many years practice on normal cases. Put blades on as if O. A.—at sides; to increase the flexion, bring the handles forward and upward; now gradually rotate forceps until occiput is opposite one spine, then remove and reapply forceps in normal position, and deliver. *Always rotate by hands when possible.*

Face Presentation.—The chin (M.) is considered in naming, instead of occiput; then deliver M. A. instead of O. P., etc.

Breech Presentation.—Forceps rarely applied to breech, but have been used in cases of impaction. Forceps not fitted to shape of hips, but best application is over trochanters, as this is long diameter. Forceps may be needed for after-coming head; with back of child to front, blades are applied underneath body, the body of child being raised up toward body of mother. Application may be pelvic or cephalic.

Version.

VERSION.—The substitution of some other part for that which presents at the superior strait; as one pole for another, or a longitudinal for a transverse presentation.

Varieties.—1. Cephalic, the head is made to present; rarely indicated. Use external method before labor, or if head is at

brim. "Partial cephalic version" is the correction of position of head in pelvis, as when head is a little to one side of brim in oblique presentations. 2. Pelvic, the pelvis is made to present; it has few indications and little use, but may be tried in oblique breech presentations. 3. Podalic, the feet are made to present; the best variety. Use bipolar method if in no haste, internal if in haste.

Methods.—1. External. 2. Bipolar (Braxton Hicks), or combined internal and external. 3. Internal.

Indications for Version.—1. The exchange of a position less favorable for one more favorable for delivery. 2. Speedy delivery, as in eclampsia. 3. Deformed pelves, with conjugate not below 8 cm. 4. To make part serve as a uterine tampon, as in placenta previa. 5. Certain cases of prolapsed cord, when cord cannot be kept in place.

Contra-Indications for Version.—1. Thick upper and thin lower uterine segments (danger of rupture). 2. Head firmly engaged. 3. Pelvis too small to allow delivery of after-coming head. dilated cervix.

External Method.—The essential conditions for its use are —1. Labor must not have commenced. 2. Liquor amnii must be present. 3. The abdominal and uterine muscles must be relaxed.

Technique.—By external manipulation alone, the part not wanted is displaced and part desired is pressed downward to brim. The child must float freely in liquor amnii. A desirable method, but unsatisfactory as a rule, as it is difficult to keep desired part in the canal.

Indications.—Is ordinarily used in transverse presentation, oblique position, with one pole on edge of brim. Technique: Force child into desired position, then put pad where the displaced breech or head was, and apply abdominal bandage. If labor is beginning and cervix is dilated, the membranes may in some cases be ruptured, then letting labor proceed.

Combined Method.—One hand in vagina, with two fingers in cervix, the other hand on abdomen. Conditions necessary are—1. Uterus must not be contracted. 2. Liquor amnii must be present, or but recently drained. 3. Abdominal walls must

be relaxed. 4. No demand for extra haste in delivery. 5. Cervix must be dilated.

Indications.—1. Podalic variety, especially in placenta previa, to secure tamponage of uterus until the head is engaged and cervix is dilated; with two fingers in cervix and one hand on abdomen, displace the part not wanted, secure foot and draw down leg. The pressure of leg in cervix stops hemorrhage, dilates cervix, and prepares for delivery. 2. When feet and breech are so close together that a foot can be secured, thus changing from breech presentation. 3. Cephalic variety, when head is near enough cervix to be secured. Not indicated if there is a demand for haste.

Internal Method.—Practically always podalic; it is the one method giving control of labor. Demands a cervix sufficiently dilated to admit hand.

Indications.—1. Speedy delivery. 2. To secure tamponage, if the cervix is dilated. 3. Conjugate not below 8 cm. 4. Prolapse of cord.

Technique.—Have patient on back, and ascertain presentation and position; have hand and forearm thoroughly sterile, using hand which corresponds to abdomen of child. With palm next to small parts, fold fingers and hand into cone and pass into cervix (cervix must be sufficiently dilated to admit folded fist, to allow birth of head). Pass hand up next to the abdomen, and secure the *anterior* foot, as—1. It is a simpler procedure, disturbing fetus and position less. 2. More apt to bring back of fetus to front. 3. Arms more apt to stay folded on chest.

One or both feet?: Unless in extreme haste, it is best to secure but one foot, allowing large breech with other leg to act as dilator for after-coming head. When one leg is down as far as knee, stop and listen to fetal heart—it may be tumultuous for a time; if the heart is all right, let labor proceed naturally. If a loop of cord is felt, place it where it will be least pressed upon—usually opposite the sacro-iliac synchondrosis.

When baby is partially born: Wrap in hot towel—1. To preserve body heat. 2. To prevent reflex inhalation before head is born, from stimulation of cold air. Do not hurry, as

arms may be dislodged if traction is exerted—they are best born folded; let child advance slowly until the arms can be secured.

DYSTOCIA FROM FETAL CAUSES.

Anomalies in Presentation.

Breech.—Breech presentation means the presence at cervix of any part of pelvic extremity, as knee, foot or buttocks. It is a semi-abnormal condition, occurring quite often.

Causes.—1. Prematurity is most common cause. 2. Excessive amount of liquor amnii. 3. Lax abdominal and uterine walls. 4. Fetal monstrosity. 5. Deformed pelvis, preventing entrance of head. 6. Multiple pregnancy.

Frequency.—Varies with time, whether term or premature: 1. Of both mature and premature, one in thirty cases. 2. Of mature alone, one in sixty cases.

Positions.—Sacrum (S.) is used in naming positions, instead of occiput as in vertex; consider child as sitting in the pelvis; L. S. A. and R. S. A., R. S. P. and L. S. P.

Diagnosis.—Signs and symptoms are—1. Presence of head above. 2. Absence of head below. 3. Fetal heart is usually heard above umbilicus. 4. Feel breech—the nates, genitals, sulcus, and sacrum.

Breech	vs.	Face.
Head in upper abdomen.		Head in lower abdomen.
Anus—small; no bony ridges; has sphincteric action.		Mouth—large; hard, bony alveolar ridges; has no sphincteric action.
Meconium discharged.		No meconium discharged unless labor is prolonged.
Feel sharp spines of sacrum.		No such projections.

Foot	vs.	Hand.
At right angles to leg.		In line with arm.
Toes short, and parallel to each other.		Fingers long, and thumb at right angle to fingers.
Heel felt.		No such projection.

Management.—On account of after-coming head, have first part of labor as slow as possible, and latter part speedy; five

minutes is limit of time for birth of head, while several hours may be given to first part. Non-interference is best in first part of labor; *do not pull on foot,* as hands may be displaced by side of head.

Mechanism.—Long diameter of hips is chiefly concerned in mechanism; it starts in oblique diameter of pelvis, and then rotates to antero-posterior diameter.

Birth of hips, shoulders and extremities: The anterior hip engages under symphysis; posterior hip slips over perineum, then anterior hip emerges, and breech is born. Feet usually come easily, anterior first, then posterior. Shoulders rotate and are born same as hips. The arms are born folded (unless disloged by traction); free anterior arm first, by finger in bend of elbow. Place the cord where least pressure—usually opposite sacro-iliac synchondrosis. As soon as hips are born, wrap child in hot towel. Support body of child upward, to prevent undue friction, and traction on neck.

Birth of after-coming head: Many methods of delivering, but the Smellie-Veit (modification of Mauriceau's method) is best: Flexion and traction are desired; flexion is obtained by two fingers in mouth, and traction by two fingers of other hand over shoulders, with hand at back. Child is supported on forearm, and at same time traction is exerted, the body is raised. When mouth is born, need of haste is past; the nurse clears mouth, and body of child is thrown forward on abdomen of mother. Support perineum same as in vertex presentation.

Management of Special Conditions.—Interference in breech presentation may be caused by—1. Impaction of breech. 2. Uterine inertia. 3. Extended legs. 4. Extended arms.

Impacted breech: The pelvis and feet are too large to pass together, and there is no advance. Indication: Pull down one or both feet and break impaction.

Uterine inertia: If labor is not advancing, deliver one or both legs, whether cervix is dilated or not.

Extended legs: The cause is not clear, but perhaps due to contraction of muscles. Indication: Go up to foot and bring down one leg; if fetal heart shows need of haste, bring down both legs. Method: Press the popliteal space outward and backward, flex the knee, secure foot and bring down leg.

Arms extended at side of head: Common when labor must be hastened (as in eclampsia), and is due to undue traction. The arms are above head, on line with shoulders or in front. Indication: Raise legs and body of child; pass fingers along abdomen or back, over posterior shoulder to elbow (the first bend) of posterior arm, then cause elbow to sweep across the face; fracture of humerus may occur. Then depress body of child, and extract anterior arm in same manner.

Nuchal hitch: An arm may be locked at back of the neck, forming the "nuchal hitch." Indication: Before extracting arm, rotate body and head, in direction to unlock hitch, until arm is free (hitch will probably be anterior arm).

Face Presentation.—Occurs once in 250 cases. Caused by —1. Something preventing flexion: (a) Tumor of neck (thyroid); (b) abnormal size of thorax; (c) coils of cord around neck. 2. Something favoring extension: (a) Oblique position of the uterus; (b) tumor of pelvis obstructing advance of occiput but not of sinciput; (c) posterior occipital position; (e) pendulous abdomen.

Positions.—Named according to position of chin (M.): L. M. A. and R. M. A., R. M. P. and L. M. P.

Diagnosis.—1. By external examination: (a) Presenting part high; (b) sulcus between hard head and body; (c) fetal heart heard most distinct over front of child instead of over back as in vertex (in vertex, heart is heard on opposite side from small parts, at side upon which most prominent part of head is felt). 2. Vaginal examination: (a) Vaginal fornix nearly flat; presenting part high—at brim; (b) after cervix is dilated, note absence of smooth parts and presence of bony ridges of orbits, mouth with alveolar processes, and chin.

Mechanism.—Most favorable condition is extension, which corresponds to flexion in vertex presentation.

L. M. A.: The most favorable position in face presentation. There is extension of head, and rotation in birth canal, the chin coming under symphysis; then flexion occurs, with eyes, forehead, bregma and occiput successively passing over the perineum; head rotates externally, then rotation and birth of shoulders.

R. M. P: The most frequent position. All cases of face

presentation probably start as brow, with continuation of the extension. Delivery is only accomplished with chin to front, hence rotation must occur. Head descends to pelvic floor only by stretching of neck, as neck is but 4 cm. long, while depth of pelvis is 4 cm. in front, 9 cm. at sides, and 12.75 cm. behind; the neck will stretch to 9 cm. at sides, but requires a long time; hence if chin is posterior, head will never be born until turned. Mortality: About 13 percent. of babies; and 6 percent. of mothers, owing to the long labor, and lacerations. Mechanism, if chin remains posterior: Nature attempts to force thorax (18.50 cm.) down through pelvis (12.75 cm.), and the result is impaction.

Results of Face Presentation.—1. Tumefaction of the eyes. 2. Pressure of top of head. 3. Increase of long diameter, and flattening of head. 4. Tumefaction of mouth. 5. Prominence of forehead.

Management.—Keep membranes unruptured until dilatation is complete—1. To prevent injury to the eyes, especially from examining finger. 2. Opening of mouth allows air to enter, stimulating respiration. 3. To allow complete dilatation.

Choice of Operation.—1. Leave to nature. 2. Manually correct position. 3. Version. 4. Forceps.

Left to Nature: Only safe when chin is to front, and child and pelvis are normal.

Correction of presentation: Best to change to vertex, if possible. 1. Schatz's method, by external manipulation alone, will probably fail, but does no harm to try; liquor amnii must be present, and head not engaged. Method: Raise shoulders up with one hand at front of baby, and push to opposite side; at same time push the head in opposite direction, flexing it. 2. Bimanual method, or manual flexion: One hand in cervix, on head, the other hand on abdomen, holding the shoulders; change position of head by flexion, about same as in Schatz's method. 3. If uterus is oblique, fetal trunk falls to one side and favors face presentation; place woman on opposite side, so uterus will fall into normal position, i. e, if uterus inclines to left, place woman on right side.

Version: If face is M. P., and presentation cannot easily be

changed to vertex, version is indicated if uterus is not firmly contracted.

Forceps: 1. With face M. A., and labor delayed, forceps is indicated if version is impossible; perhaps better than version. 2. With M. P. (in center), only indication for use of forceps is in starting rotation, and much skill is required for this; a vectis may be used for this, as traction is not indicated until M. A. If child is impacted, do craniotomy, if dead; if alive, perform Cesarean section.

Brow Presentation.—Rare; said to be one in 1,500 cases. The head remains throughout labor in a position midway between vertex and face. One of worst presentations for both mother and child, as with normal pelvis and child the delivery is impossible.

Diagnosis.—Vaginal examination shows the brow presenting, with orbits on one side and large fontanelle on the other; one parietal is flattened against promontory; the anterior presents.

Management.—1. Correction is indicated; it is sometimes possible to change to vertex or face, preferably vertex, as it will then generally deliver normally. With hand in vagina, flex head; but if woman has been in labor for some time, the head is flattened, broadened and lengthened from moulding, and correction is impossible. If vertex is impossible, try to change to face, M. A. 2. Version, if not contra-indicated. 3. If head is engaged M. A., and there is danger of rupture from version, the head may be extended with forceps, bringing the chin to front. 4. With M. P. and the head fixed, and manual correction is impossible, try traction with forceps to make it face M. P., then attempt to rotate in the canal to M. A. 5. If delivery is impossible, do (a) craniotomy if child is dead (the fetal heart is usually feeble, hence use care in diagnosis); or (b) Cesarean section; delivery will be very difficult if head is firmly engaged—disengage it by one hand in vagina.

Transverse Presentation.—The presentation of any part of the fetal trunk; practically means shoulder. One case in 169 at Sloane.

Etiology.—1. Uterine causes: (a) Malposition; (b) abnormal shape; (c) pendulous abdomen; (d) uterus bicornis; (e) uterus deformed by fibroids; (f) placenta previa. 2. Anything

interfering with cephalic or pelvic presentation: (a) Maldevelopment of the pelvis; (b) tumors; (c) malformed child. 3. Excessive mobility of child: (a) Prematurity; (b) excessive liquor amnii or polyhydramnios.

Diagnosis.—Inspection and palpation show long diameter of uterus to be transverse. Vaginal examination shows presence at cervix of scapula, clavicle or ribs, and absence of the hard, round head; a hand may present if membranes are ruptured.

Positions.—Anterior or posterior, according to back (D.) of fetus; right or left, according to head. Positions are L. D. A. and R. D. P., L. D. P. and R. D. A. L. D. A. is most common.

Mechanism.—Ordinarily none; with uterine contractions, the child is forced into pelvis, the uterus becoming drawn out; the child dies, and uterus ruptures if neglected, as delivery of normal sized child is impossible.

Results.—1. Death of child and rupture of uterus if neglected. 2. Spontaneous version: Starts as transverse, but head gains position in pelvis; can only occur when liquor amnii is present and fetus is free to move, and requires vigorous contractions. It is the same process as occurs during pregnancy, being delayed until labor; it is most likely to occur with living child. 3. Spontaneous evolution: Less common than version, and occurs only with dead child; two methods—(a) The child is crowded down into pelvis, with body folded upon itself; the head remains stationary, everything else going down past it—thorax, side, breech, legs, feet and head, in order. (b) Child goes down as a wedge, head and thorax together, and feet last; it is only possible with a "putty-like" child.

Prognosis.—For mother and child, depends on the doctor, and how soon he sees patient. In early stage, prognosis is good; if left alone, prognosis is bad for both.

Treatment.—Version is the only treatment; before the labor begins, try external method; if in labor and membranes have ruptured, use internal method. Podalic variety is indicated in most cases. Remember danger of rupture; it is better to sacrifice child than mother. If arm is down, best to tie with sterile tape or bandage before doing version, to keep the arm away from side of after-coming head.

Impacted child: If child is impacted, and uterus is firmly

contracted, version is contra-indicated; the child is dead, or nearly so, and Cesarean is impossible. Indication: Perform decapitation, deliver body, then head.

Complex or Compound Presentation.—More than one part presenting; as head and hand, head and foot, hand and foot, head and two or more extremities; usually head and hand. A rare condition, occurring once in 250 cases.

Causes.—Disproportion between child and canal, or lack of conformity: 1. Head too large. 2. Too great mobility, from excessive amount of fluid. 3. Pelvic deformity. 4. Anything which interferes with cephalic or pelvic presentation. 5. Attempts at version with failure to rotate.

Treatment.—Replace the part not desired; if replacement is impossible (from contraction of uterus), apply forceps to the head alone (if head and extremity are presenting), and exert traction, avoiding the other part. If hand presents, secure it by a loop of tape before replacing—1. To be able to pull arm past head if version is done. 2. To be able, if necessary, to recognize it as first child born, should there be another child (primigeniture). If other treatment fails, perform Cesarean section if child is alive, or embryotomy if dead.

Multiple Pregnancy.

Frequency.—1. Twins, one in about eighty-six cases (at the Sloane Maternity, thirteen pairs in 8,000 cases). 2. Triplets, one in about 5,000 cases (two at Sloane).

Etiology.—Twin pregnancy may be caused by—1. Development of two separate ova, from one or two Graafian follicles; the most common cause. 2. May result from one ovum with two nuclei (double yolked egg).

Development.—1. If from two ova, there is a separate amnion and chorion for each fetus, and generally a separate decidua reflexa, if points of lodgment have been far enough apart; if close together, the decidual membranes fuse, and there is also fusion of placentæ. 2. If from one ovum with two nuclei, each child has separate amnion, but when seen there is a common chorion and decidua.

Sex.—1. If from one ovum, same sex. 2. If from two ova, sex may be the same or opposite. (Of thirteen pairs at the Sloane, five were of opposite sex; five were males, and three were females.)

Placentae.—1. Twins, placentæ may be separate or fused. 2. Triplets, placentæ may be separate, all fused, or may be two with one double.

Presentation.—More commonly vertex. (Of thirteen pairs, eight were both vertex; four were vertex and breech; one was both breech,)

Diagnosis.—As a rule by inspection; the abdomen is larger in transverse diameter, and as a whole is larger than normal. Sulcus usually seen between fetuses. Twins are shown, on palpation, by presence of two heads and two breeches; or on auscultation by two hearts.

Prognosis.—Uncertain for both mother and children; the results of multiple fetation are bad for both:

Mother.—1. Abnormal pressure. 2. Greater excretion of toxins, hence albuminuria and eclampsia are more common. 3. Uterine inertia is common from over-distention, and results in postpartum hemorrhage. 4. More danger of infection from surgical interference.

Children.—1. Apt to be premature, from early over-distention of uterus; hence children are under-developed. 2. One is apt to gain nourishment at expense of the other; hence one is apt to be undersized, ranging from slight underweight to "fetus papyraceus"—the remains of an early fetus in the membranes of a normal baby. 3. Circulation may be interfered with, from pressure of one child on the other, or from locking, due to (a) both heads presenting, the head of one being locked against the neck of the other; (b) one presenting by breech, the other vertex, and locking chin to chin; (c) one baby transverse, the other sitting astride its body,

Management.—Labor, in multiple pregnancy, is tedious, due to uterine inertia from over-distention.

First Child.—Labor is usually normal, but slow. After the birth of first child, tie cord twice, owing to placental anastomosis

(better to tie all cords twice). Wait fifteen to thirty minutes before rupturing second membranes, to allow uterus to contract.

Second Child.—Examine presentation, and if normal, rupture the membranes and let labor proceed. There is usually little difficulty, as maternal tissues are already stretched. It is necessary to hold fundus for at least an hour after birth of last child.

Triplets.—Management is same as in twins. The babies are usually smaller, and it is exceptional to get more than one living child.

Placentae.—Both may be expelled after birth of first child, in which case second child must be delivered at once.

Locked Twins.—In case of locked twins, push up obstructing head and deliver first child; if this fails apply forceps to head of second child and deliver it past the first. As a last resort decapitate first child and deliver second with forceps.

Anomalies in Fetal Development.

Overgrowth of Child.—Prolongation of pregnancy may cause dystocia from overgrowth of child (prolonged (?) pregnancy is usually due to miscalculation). Best not let go more than three weeks beyond expected date. Impregnation may not occur until just before period succeeding insemination, but just in time to stop menstruation; hence pregnancy may go three weeks beyond expected time. Watch carefully the relative size of child and pelvis; if child is getting too large, induce labor. 2. Overgrowth of one or both parents, and especially a large father and little mother. 3. Multiparity—size of child increases with each successive pregnancy up to fourth or fifth; size remains stationary for two or three pregnancies, then decreases up to menopause.

Premature Ossification of Head.—Moulding is impossible, and no overlapping of cranial bones can be felt. The condition is difficult to diagnose. Craniotomy, Cesarean, or forceps may be necessary.

Fetal Monstrosity.—Especially double monsters, as double heads, double bodies, or both (e. g., Siamese twins). Action of Nature in delivering monsters is marvelous, and embryotomy,

etc., is rarely necessary. It is justifiable to sacrifice one or both children if necessary for safety of mother.

HYDROCEPHALUS.—A common condition. The fluid as a rule is in ventricles (lateral); but may be outside of brain, or even outside of skull.

Diagnosis.—Suspect hydrocephalus if the head does not advance and is felt above pubes, with bones soft, sutures widely separated and fontanelles long. First make sure that trouble is not due to distended bladder; if there is no advance with strong pains and normal pelvis, disinfect hand, go into lower segment and feel.

With breech presentation the body is born normally, while the head fails to engage and can be felt as a large mass above the brim.

Treatment.—If sufficiently marked to cause pronounced dystocia, the child is not worth saving, hence tap the head and remove the fluid. Forceps is not indicated, owing to poor application, with slipping, and laceration of the maternal soft parts. If head is too large after removing fluid, do cranioclasty or craniotomy. If, for any reason, the child must live (e. g., when necessary to have an heir), then tap head, providing presentation is vertex, and after birth, strap up head so child will live for a short time. May sometimes be best to do version. The danger to mother is considerable if attempts are made to save child.

Breech presentation: Breech may be borne before diagnosis is made; the head may be sufficiently drawn out to be born, but if delayed, tap behind the ear or through spinal canal.

Prognosis.—Difficulty in labor is not proportionate with the amount of fluid—with large amount of fluid, bones are thin and easily moulded, while with a small amount of fluid, the bones are solid, moulding is impossible and labor is difficult. The latter are disappointing cases, as they later develop hydrocephalus.

ENCEPHALOCELE.—"Hydrencephalocele." A hernia of skull, containing brain matter and fluid; causes dystocia from the malformation. If in occipital region, the tumor is large; if in frontal region, tumor is small. The dystocia is not usually marked, as tumor is in line with head.

Accidents Causing Dystocia.

Prolapse of Cord.—The cord is said to be prolapsed when it presents with, or slips past presenting part.

Etiology.—1. Lack of conformity of the presenting part and pelvis, and favored by (a) downward direction, and (b) slipperiness of cord. 2. Multiparity—a large, lax uterus, and poor conformity. 3. Polyhydramnios, with sudden gush of fluid. 4. Malposition of uterus, as from pendulous abdomen. 5. Abnormally long cord. 6. Abnormal insertion of cord, as velamentous or marginal. 7. Dead child. 8. Standing position during labor. 9. Placenta previa. 10. Pelvic deformity.

Diagnosis.—1. Before rupture, feel worm-like, looped mass at side of presenting part. 2. After rupture, feel cord; the presenting part may be within loop, but is usually at the side. May be mistaken for prolapsed intestines, from rupture of the uterus or child.

Management.—Treatment depends on whether or not cord pulsates; if not, then child is dead, and there is no need for haste; if pulsations are felt, child is alive, and cord must be replaced.

Position of woman: To replace the cord, have woman's head low and pelvis elevated:—1. Knee-chest, probably the best in private practice. 2. Trendelenburg, on inverted chair.

Method: Keep hips elevated until membranes rupture and part is engaged; after rupture, if cord presents, put woman in knee-chest position and replace: 1. Introduce fingers into cervix and push cord back to side of presenting part, letting the part come down past cord. Best to replace by fingers if possible; if not use—2. Soft rubber catheter, with loop of tape through eye; apply end of catheter to cord, and hook loop of tape over end of catheter; while passing in upward direction the loop remains in place and carries the cord with it, but on withdrawing catheter the loop slips off, releasing the cord. 3. If impossible to keep cord in place, apply forceps, being careful not to compress cord under blades; or do version, as mortality of breech with prolapse is only half that of vertex with prolapse; this only applies where forceps is contra-indicated from non-dilatation of cervix.

Mortality. 1. For child: Vertex, 64 percent., breech, 32 percent.; hard head shuts off fetal circulation, while the soft

breech does not fit so closely. If breech presents, place cord where least pressed upon, and watch the fetal pulse. 2. For mother: (a) From interference in doing version; (b) early separation of placenta from traction; if breech presents, and cord is between legs, endeavor to pull down loop and place to one side of presenting part.

HEMORRHAGE.

A. Before labor, from { 1. Abnormally situated placenta. 2. Normally situated placenta. 3. Abnormally situated placenta and fetus.

B. During labor, from { 1. Abnormally situated placenta. 2. Normally situated placenta. 3. Lacerations.

C. After labor..... { 1. Postpartum hemorrhage (so-called). 2. Puerperal hemorrhage.

Hemorrhage Before Labor.

Placenta Previa.—Placenta situated wholly or partially in that part of the uterus which dilates during labor—the lower uterine segment. ("Unavoidable hemorrhage," as opposed to "accidental hemorrhage" from normally situated placenta.)

Varities.—1. Complete, when internal os is entirely covered. 2. Incomplete, when the os is not completely covered; may be (a) lateral, when placenta does not reach os; (b) marginal, when just reaching os; (c) partial, when overlapping os.

Etiology.—1. Rare in primipara. 2. More common in multiparæ, the liability increasing with each successive pregnancy. 3. Low implantation of ovum—(a) primary, when first lodgment is low; (b) secondary, when first attachment of ovum was imperfect, with subsequent slipping down, usually due to endometritis, subinvolution, malformed uterus, or multiple pregnancy.

Frequency of Placenta Previa.—Ordinarily, one in 750 cases; at Sloane, one to 154, in 8,000 cases.

Source of Blood.—From thickened decidue serotina, and not from fetal part, unless from injury; hence danger to mother.

Diagnosis.—Hemorrhage in first three months is not from placenta, as placenta is not formed until third month; most common time is from the sixth to seventh month. 1. Note discharge of bright red blood, usually without pain (unless in labor). 2.

Cervix is softer, more congested and purple, and pulsations in the vagina are more marked than normal. 3. Indistinctness of presenting part. 4. Edge of placenta may be felt with the finger, but in lateral implantation this cannot be verified positively.

Cause of Hemorrhage.—Difference in rapidity of growth of placenta and lower segment, the uterus growing faster. The hemorrhage may occur at any time, whether violently exercising or lying quietly in bed.

Indications.—The one indication is to empty uterus; soften cervix and proceed to induce labor. "Red blood is red flag of danger." Amount of first hemorrhage is no indication of amount of second or third; the first may be slight in amount, followed by a second and fatal hemorrhage. Does not always occur during pregnancy (seventh month), but may occur first during labor and be fatal. The nearer complete the placenta previa, the more severe the hemorrhage; if lateral, it may not be found until after a normal labor, as head comes down and presses on placenta, preventing hemorrhage.

Treatment.—With pronounced hemorrhage from placenta previa occurring at seventh month, do Braxton Hicks' version as soon as possible: Pull down foot, thigh and half breech, to plug cervix; this dilates cervix and checks hemorrhage. If cervix is undilated (less than two fingers), dilate it with gauze or bag for one or two hours; then introduce fingers and bring down the part. If the placenta has lateral implantation, with little bleeding and vertex presentation, rupture membranes and let child come down, as pressure of head will check bleeding.

Prognosis.—Not more than 5 percent. of mothers should be lost, while the mortality of babies is 50 percent., owing to—1. Prematurity (large percent.). 2. Malposition or malpresentation. 3. Prolapse of cord (common). 4. Version, with early delivery through cervix not well dilated.

Premature Separation of Normally Situated Placenta.—Hemorrhage may occur before or during labor, from—1. Hemorrhage into placenta (white infarct, placental apoplexy), from diseased vessels, with formation of blood clot. 2. Premature separation of the placenta (accidental hemorrhage). The hemorrhage may be open or concealed.

Etiology.—1. Placenta is less firmly attached in later months. 2. Multiparity. 3. Endometritis. 4. Disease of kidneys, as threatened eclampsia and nephritis. 5. Short cord pulling on placenta. 6. Syphilitic disease of placenta. 7. Severe infectious diseases, as smallpox, or scarlatina. 8. Falls, blows, etc. 9. Toxemia. 10. Over-stretched uterus, as from polyhydramnios, etc. 11. Malformations of uterus. 12. Subinvolution.

Varieties.—1. Complete (rare). 2. Incomplete; hemorrhage is open or visible, or concealed (a) opposite middle of placenta; (b) may break through placenta into amniotic sac; (c) blood dissects upward under membranes; (d) may form clot and plug cervix. Bleeding usually becomes open, but often not until too late to save life after being detected.

Symptoms and Diagnosis.—1. Tearing pain at site of hemorrhage, due to stretching of uterine fibres (no pain in placenta previa). 2. Placenta not felt (it can be felt in most cases of placenta previa). 3. Often a bulging, boggy mass at site of hemorrhage (absent in placenta previa). Aside from hemorrhage, the three most important symptoms are—1. Tearing pain. 2. Bulging mass. 3. Shock of internal hemorrhage.

Premature Separation of Placenta	**vs.**	**Rupture of Uterus.**
Occurs during pregnancy or early in labor.		Usually late in protracted and difficult labor.
Membranes usually not ruptured.		Membranes ruptured.
Uterus is large and flabby, and but slightly contracted.		Uterus firmly contracted.
Presenting part does not recede.		Presenting part recedes.

Premature Separation of Placenta	**vs.**	**Placenta Previa.**
Tearing pain.		Usually no pain unless in labor.
No placenta can be felt.		Placenta may be felt.
May feel bulging mass near fundus (hematoma).		No such mass felt.

Mortality.—The danger is greater in concealed than in open hemerrhage, hence high mortality. 1. Mortality of children, 90 to 100 percent. 2. Mortality of mothers is high, and depends on the treatment instituted.

Treatment.—Disregard child, as it is usually dead unless the hemorrhage is slight; consider only life of mother, combatting

shock and hemorrhage. For shock, use strychnin. For hemorrhage, empty uterus as speedily as safety to soft parts will permit; using version or forceps, causing the presenting part to press upon bleeding area. After bleeding has been stopped, make up amount of blood lost by infusion of salt solution, and keep the uterus contracted. Small hemorrhages into the placenta may occur without danger and without being noticed, the child going on to delivery; shown after birth by white placental infarcts.

Ectopic Gestation.—1. Internal bleeding, into the abdominal cavity, from rupture of Fallopian tube. 2. Bleeding from the uterus, from separation of decidua.

Hemorrhage During Labor.

Rupture of Uterus.—Most likely to occur before child is out, about once in 3,000 or 4,000 cases. Generally due to lack of judgment on part of obstetrician.

Etiology.—Lower segment thins, while the upper segment thickens; while in this condition—1. If obstruction is insurmountable, uterus goes on to rupture ("capped uterus"—the upper uterine segment can be felt resting on upper pole of child). 2. Attempts at version with uterus firmly contracted. 3. Fatty degeneration, old cicatrices, or fibroids may act as predisposing causes. 4. Anything obstructing advance of head. 5. Forceps improperly applied.

Location of Rent.—Usually in lower segment, the line being horizontal; on left side, right side or behind, in order of frequency; may also extend upward, in T-shape.

Varieties.—1. Complete, when extending entirely through uterine wall into abdominal cavity. 2. Incomplete, when extending partially through wall.

Results.—In incomplete variety, peritoneum may be stripped off, forming a large cavity which contains blood and part or whole of fetus; hand may pass into this cavity, and intestines be felt through the thin peritoneal membrane.

Symptoms.—1. Labor pains cease. 2. Tearing pain. 3. By feeling through abdomen, upper segment is found small and hard. 4. Recession of presenting part. 5. Presense of tumor. 6. Hemorrhage, as a rule. 7. Shock. Diagnosis is often not made

until after labor, as when version is done in unsuitable cases—the patient is usually under chloroform and the pain is absent; however, hemorrhage and shock are guides.

Treatment. — Prophylaxis: Avoid over-distention of lower segment, by—1. Correcting malpresentation. 2. Avoiding version in tonic uterus. 3. Not allowing labor to remain long in second stage (rule, two hours).

Active treatment: 1. Incomplete: Not necessary to open abdomen; clean out uterus and sac, and pack the cavity, using plain or, better, weak iodoform gauze. 2. Complete: The laceration is usually worse, the shock and hemorrhage more pronounced than in incomplete variety; the upper and lower segments may be almost entirely separated. Treatment depends on circumstances—if alone, packing is safest; if help is at hand, open abdomen, irrigate, and sew up rent, or amputate uterus. Give infusion of salt solution, strychnin, etc., for shock.

Delivery of Child after Rupture of Uterus.—If rupture is small, deliver through natural passage; if most of child is in abdomen, deliver by Cesarean.

Mortality.—Children, 90 percent.; mothers, 60 percent. The mortality of mothers is lower when abdominal section is possible, but difference does not justify the risk of doing laparotomy when without assistance.

Laceration of Cervix.—With fundus firmly contracted, hemorrhage must come from lacerations of cervix or vagina, or both.

Causes.—1. Premature or precipitate labor. 2. Premature rupture of membranes. 3. Extraction of head (forceps, etc.), before dilatation is complete. 4. Impaction of interior lip of cervix between head and symphysis. 5. Abnormal rigidity of cervix, from cicatrices, etc.

Diagnois.—1. If fundus is relaxed and blood comes in gushes, it is probably from uterus. 2. With fundus firmly contracted and perineum intact, a steady flow of bright red blood is probably from cervix. 3. Bleeding from vagina or perineum can be detected by damming back blood from above with cotton or gauze sponges.

Treatment.—If the laceration is small and bleeding is slight, or if no instruments are at hand, give a hot acetic douche, and

pack with gauze; if laceration is extensive, best to repair it, as suturing is the best means of checking hemorrhage.

Sutures: Have speculum, scissors, volsella, artery clamps, needles and suture material; silkworm gut is best, but catgut or silk may be used. If no volsella at hand, pull down cervix with stitch in anterior and posterior lips (tissues are relaxed and easily brought down). Begin at upper angle of tear, leaving a large opening. (That it interferes with involution is one argument against immediate repair, as the cervix may become contracted, and retained lochia favor infection; hence leave a larger canal than appears necessary, to allow good drainage.)

Complications.—Rupture of uterus may result from extensive lacerations of cervix running up into lower uterine segment.

Lacerations of Vagina and Perineum.—Should be repaired at once, as—1. Pain is slight (parts are non-sensitive from pressure). 2. Lessens danger of infection. 3. Prevents future relaxation. Any tear a half inch or over in extent should be repaired.

Rupture of Bulbs of Vestibule.—Use pursestring suture, as it is impossible to catch bleeding points and needle may increase hemorrhage. If suturing fails to check bleeding, pack with gauze.

Hemorrhage After Labor.

Postpartum Hemorrhage.—So called, when occurring within twenty-four hours after birth of placenta. 1. Before birth of placenta, from partial separation, and inability of uterus to contract and close vessels. 2. After birth of placenta, from relaxation of uterus due to uterine inertia; or may be due to lacerations.

Conditions Normally Preventing Hemorrhage.—1. Increased coagulability of blood during pregnancy. 2. Contraction and retraction of uterus, closing vessels (chief factor).

Causes of Relaxation of Uterus.—1. Favoring relaxation: (a) Poorly developed uterine muscle; (b) over-stretched muscle; (c) over-tired muscle; (d) muscle weakened by disease; (e) too rapidly emptied uterus; (f) insufficient innervation of the muscle from disease. 2. Preventing contraction: Causes inside uterus are (a) retained placenta; (b) retained blood clots; (c) fibro-

myomata. Causes outside uterus are (d) adhesions fixing the uterus; (e) over-distended bladder or rectum.

Symptoms.—Have symptoms well in mind, as there may be no external signs of blood and yet woman die from internal hemorrhage. Note if uterus is firm and hard (normally size of a cricket ball), or a soft bag of blood clots, which are expressed with a gush on squeezing fundus.

Signs of hemorrhage: Pallor of face, pinched nose, rapid pulse, shallow respiration, air hunger, the patient wanting to be fanned; restlessness, gasping, obscured vision.

Treatment.—Prophylaxis is most important: 1. Have good hygiene, plenty of fresh air, etc., during pregnancy to prevent weak muscle. 2. Don't leave too long in the second stage of labor; deliver by some operative treatment rather than let the woman become exhausted. 3. Third stage: Deliver placenta early, but not within twenty minutes after birth of child; use Crede's method of expulsion, avoiding traction. Have fundus held for fifteen minutes after child is born, and forty-five minutes after birth of placenta (one hour in all)—holding it until uterus contracts and stays so; this prevents formation of clots.

If clots form in uterus, disinfect hand, go in and get them; if uterus is still bleeding, the pressure of hand inside, with the other hand on abdomen, will usually stimulate contractions and stop bleeding. A hot douche (116° to 120° F.), simple, saline or astringent (2 to 6 percent. acetic acid solution), may check hemorrhage. If other means fail, follow by gauze packing, having gauze reach well to fundus.

Packing of uterus: Iodoform gauze is best, as it keeps sweet longer; it should be removed in twenty-four hours, washing out any clots remaining. If no gauze is at hand, do not wait, but use anything clean, as newly laundried towels, sheets, etc., torn into strips—the danger from infection being less than that from bleeding; this must be removed sooner than if sterile packing is used. A large amount of gauze is necessary—uterus and vagina must be completely filled.

To stimulate contractions of uterus, ergot in some form may be used; give 2 dr. of fluid extract, or ½ to 1 dr. of ergotol by mouth, or 15 m. of ergotol hypodermatically.

To compensate for loss of blood: 1. Give intravenous saline

infusions at bend of elbow. If no cannula at hand, use aspirating needle in breast or back (hypodermatoclysis); it is painful and less rapid, but fluid is readily absorbed. 2. Elevate legs and hips, and compress abdominal aorta. 3. Elevate foot of bed and bandage extremities, frequently changing bandage from one to other extremity (bleeding into veins). 4. Saline rectal enemata are of great value, relieving thirst and supplying blood. 5. As soon as patient has rallied, give water frequently and in small amounts, as much as stomach will tolerate.

Stimulate patient by use of strychnin, 1-30 gr. every hour; or give morphin, ⅛ gr. (Magendie's solution). Begin administration of iron as soon as possible. The food should be easily digested and nourishing—remember the stomach is sensitive; give milk and lime water, broth, etc.

Puerperal Hemorrhage. — (So-called.) Any hemorrhage occurring between twenty-four hours and one month after labor.

Causes.—Anything which interferes with the contraction and retraction of uterus. Predisposing causes are—1. Lack of massage of fundus. 2. Distended rectum (do not let go over twenty-four hours). 3. Over-distension of bladder (catheterize every eight hours if woman cannot void). 4. Displacements of uterus. Active causes: Some foreign body in uterus, as—1. Retention of portions of placenta or membranes, or blood clots (most common); hence examine placenta and membranes in every case to see if intact. If only a small portion of amnion or chorion is left (size of silver dollar), it is not necessary to go in unless the temperature rises in a day or two; if a large portion is left, sterilize hand and remove it at once. Portions of placenta succenturiata may be left and give rise to trouble. 2. Placental polypus—a persisting villus, with fibrin, etc., deposited around it; may remain for a month or even a year preventing normal contractions of uterus. 3. If flexion occurs, clots may accumulate and bleeding occur from resulting congestion. Retroflexion is caused by over-distended bladder; anteflexion (less common), from distended rectum. 4. Emotion—family discord, etc.; vessels open and uterus balloons up.

Treatment.—Clean out uterus, and keep it contracted with ergot or ergotol. Remove polypi with fingers or curette.

PATHOLOGY OF THE PUERPERIUM.

Inversion of Uterus.—(Procidentia, prolapse). The rarest of all accidents to parturient woman. Occurs with equal frequency before and after delivery of the placenta.

Varieties.—1. Complete, when the uterus is inside out and upside down. 2. Incomplete, when there is a cup-shaped depression in the fundus. It may be—3. Acute, the only form considered in obstetrics. 4. Chronic, the result of acute, or caused by weight of fibroid.

Causes.—Often caused by the accoucheur; it is favored by relaxation of uterus. 1. May occur spontaneously, from the weight of placenta pulling down fundus, or from short cord (rare). 2. Too vigorous application of Crede's method is the cause of many incomplete inversions; if slight, may correct itself. 3. Pulling on cord, to extract placenta, as once practiced, was a common cause.

Symptoms.—1. Shock, especially if the inversion is complete (inexplicable). 2. Hemorrhage, due to interference with contraction. 3. Pain, like tenesmus, from uterus contracting on inverted portion.

Diagnosis.—1. Inspection and palpation show absence of the fundus above. 2. Presence of tumor below. 3. Uterine character of tumor, especially if it can be felt; perhaps placenta is attached, and openings of tubes may be seen. Must be differentiated from plypus, or pediculated uterine fibroid.

Inversion of the Uterus	vs.	Pediculated Fibroid.
Tumor is central.		Tumor is usually lateral.
Sound passes all around, but does not pass into uterus.		Sound passes the whole length of uterus except at attachment of pedicle.
Fundus is absent or indented.		Fundus is not indented.

Treatment.—Propnylaxis: 1. See that the uterus is firmly contracted and retracted after labor. 2. Use care in expelling placenta, not to indent fundus. 3. Avoid traction on cord.

Active treatment: 1. If uterus is completely inverted, and outside vagina or vulva: First separate placenta, if attached. To replace portion outside, begin by pushing back, with tips of fingers, that part first which came out last, beginning at the cervix

posteriorly; the greatest difficulty is in starting, and this increases with the length of time uterus has been inverted. Use great care not to bruise tissues; may try twice, or even three times, at intervals of five or six hours, each time using an anæsthetic. 2. If impossible to replace early, wait five or six weeks until involution has taken place, unless the symptoms are urgent. 3. In subacute and chronic cases, start with colpeurynter (elastic bag); then try method as at first, with fingers at cervix and one hand on abdomen. 4. In partial prolapse, insert sterile hand into uterus and round out the inverted fundus. 5. Cutting operations: (a) Open the abdomen, dilate ring from above with glove-stretcher, and replace uterus (not recommended). (b) Cut ring from below, replace uterus, and sew up cut (Hirst). (c) Removal of uterus may be indicated at any time, especially if there is sloughing. After replacement of uterus stimulate contractions with ergot, hot douche and packing.

Eclampsia.—A series of convulsive movements, with loss of consciousness, and ending in coma; may occur during pregnancy, labor or puerperium.

Etiology.—Many theories: 1. Accumulation of urea in the blood. 2. Formation of ammonium carbonate in the system. 3. Spasm of arteries in brain. Either of these may be associated with the disease, but none explain. It is due to storing up in body of certain toxic materials which should be eliminated; the kidneys (most probably), liver, skin, intestines, and lungs may one or all be at fault. There are certain changes in the liver which resemble those in acute yellow atrophy.

Occurrence.—Most apt to occur in those cases where uterine and abdominal pressure is greatest, as in—1. Primiparæ. 2. Multiple pregnancy. 3. Very young or very old women.

Symptoms.—Premonitory: The responsibility is greatest in threatened cases, as premonitory symptoms do not always exist; the attack may be brought on suddenly by exposure, excessive eating, drinking of wine, etc.; hence avoid over-eating, and exposure of skin in pregnancy—low neck dresses and banquets. Be on guard for—1. Headache. 2. Disturbances of vision, as blurring of print and twitching of lids. 3. Disturbances of hearing, as tinnitus aurium. 4. Pain in the epigastrium. 5. Nausea and

vomiting. 6. Nervous symptoms (generally first to appear), as nervousness, irritability or apathy. 7. High tension pulse.

Active symptoms: 1. Twitching of eyelids. 2. The pupils alternately contract and dilate. 3. Twitching of mouth. 4. Tonic spasms of fingers, hands, arms, jaws, respiratory muscles; tongue may be bitten; fingers and thumbs are flexed in palms, forearms are flexed on arms, etc. 5. Face is cyanosed. 6. Head is drawn to one side, eyes in opposite direction. These symptoms last but a few seconds, then—7. Clonic spasms come on, with jerking of whole body; this lasts for from one to five minutes, and is followed by—8. Coma, lasting for half an hour. There may be many attacks—a case with eighty convulsions has been reported.

Symptoms of grave case: 1. Elevation of temperature, if it rises with each attack. 2. Large number of convulsions. 3. Condition of urine; after first attack, there is diminuation in quantity, urea is diminished, and there is a large amount (as much as 16 percent.), of albumin; casts, and perhaps blood. 4. High tension pulse. Three hundred grains of urea in twenty-four hours is a liberal amount. A danger signal is an increasing amount of albumin which does not yield to treatment, and a decreasing amount of urea, combined with nervous symptoms.

Diagnosis.—Eclampsia must be diagnosed from other conditions associated with convulsions, as hysteria, brain disease, etc., and especially from epilepsy.

Eclampsia	vs.	Epilepsy.
Patient is not subject to convulsions.		Subject to convulsions.
Urine usually shows albumin.		Urine usually shows no albumin.
Œdema common.		No œdema.
Prodromal symptoms, as a rule.		None, except aura.
Rising temperature.		Temperature normal.

Eclampsia	vs.	Hysteria.
Unconsciousness.		Usually not unconscious.
Coma.		No coma.
Urine scanty.		Urine abundant.
Albuminuria.		No albumin in urine.
Decrease in urea.		Urea normal.
Muscular contractions more marked.		Less marked.

Prophylactic Treatment of Eclampsia.—Begin early in pregnancy, watching urine, and advising as to food, clothing, care, etc.; examine urine frequently, even once a day in suspected cases, and watch for any evidences of lack of elimination, as headache, œdema, scanty urine with abumin and decreased amount of urea, etc.

Sources of toxins: 1. The ingestion of too much food of nitrogenous character, especially red meats (potassium compounds). 2. Storing up of bile. 3. Accumulation of intestinal contents, with fermentation. 4. Storing up of products of metabolism of mother and child (if child dies during attack the symptoms cease). Hence, if symptoms appear, shut off red meats, allowing, at the beginning only, white meats and fish; keep liver active, and bowels freely open with calomel and salines. Flannels should be worn, and no "lo and behold" dresses. Order frequent warm baths, taken at night, and advise free ingestion of water, —specify the kind of water, time for drinking and the number of glasses (six) to be taken daily in order to make patient drink freely.

The kidneys may be embarrassed in pregnancy even when normal; they are often abnormal, due to congestion (kidney of pregnancy), and if the seat of nephritis, they are still less able to take care of excretion. If albumin is present in urine, and steadily increasing in amount, with a low percentage of urea (anything under 300 gr. daily), begin treatment at once.

If more marked symptoms appear, put patient on milk diet, and lower tension of pulse with nitroglycerin. If symptoms still continue, put patient to bed and continue the treatment; further stimulate skin by wet pack, covered by rubber blanket, and give plenty of drink—lemonade or water with potassium citrate (1 dr. to each 8 oz.); or "tartar water," made with potassium bitartrate (1 dr. to each 8 oz.). If symptoms have not yet abated, it is not wise to try to tide over to term, but best to get rid of fetal metabolism (Nature's method).

Treatment of Eclamptic Seizure.—The three indications are to—1. Control the convulsions. 2. Empty the uterus. 3. Stimulate avenues of elimination.

Convulsions: 1. Chloroform is the one drug used in every case for control of convulsions; use as little as possible, and only

during the attacks. Be ready for another convulsion as soon as coming out of one. 2. Opium is not so good, as elimination is checked; if pulse is strong, and the patient is thrashing about, a hypodermatic injection is justifiable. 3. Chloral is valuable as a routine treatment in almost every case; give 30 gr. by rectum, as soon as convulsions begin. 4. Veratrum viride; the fluid extract is a fairly constant preparation; it reduces the pulse rate and lowers temperature. Indications (same as for venesection): With a hard, rapid and bounding pulse, give 5 m. of the fluid extract hypodermatically, repeated in thirty minutes; if pulse has not dropped to sixty within thirty minutes, give a third injection. It is not indicated in every case. After its use, do not allow the patient to sit up in bed for some time, as it is a depressing drug.

Emptying uterus: Mother is liable to danger, and child is apt to die as result of disease; hence best to relieve woman of child. Rule: After one convulsion, empty uterus as soon as is safe for tissues of canal. If cervix is soft and dilated, use accouchement force—dilate with fingers, insert hand, pull down leg and extract child; go slow (take fifteen to thirty minutes), and avoid lacerations. Child is premature, but it is better to take chances of raising it than let it die in utero. If cervix is hard, dilate with gauze packing or elastic bag, and deliver as above (version).

Stimulating elimination: 1. Best means is by giving rectal irrigations of saline solution, using a double tube and Kelly pad, and continuing for twenty to thirty minutes each time; this empties bowels, and stimulates skin elimination through water absorbed. 2. If the patient is still comatose, introduce gastric syphon and wash out stomach; then introduce, through tube, 5 gr. calomel and 1 or 2 oz. magnesium sulphate. 3. After recovering from shock of delivery, stimulate skin by (a) hot pack—wrap patient in blanket wrung out of hot water, and cover with rubber sheet; or (b) put into tub of hot water.

Treatment in next twenty-four hours: 1. Give chloral per rectum, 20 gr. every two to four hours if needed. 2. Nitroglycerin, by mouth or hypodermatically, 1-100 gr. every four hours to 1-50 gr. every two hours. 3. Strychnin may be needed to overcome shock. 4. If shock is severe, give intravenous injection of normal salt solution, 1,000 c. cm. to 1,200 c. cm. Next morn-

ing the patient may be in a semi-comatose state, and able to speak; on second day she should have regained complete consciousness.

Mode of Death.—Patient may die from exhaustion, due to frequent convulsions; œdema of lungs or brain; asphyxia, from spasm of the respiratory muscles; heart failure; apoplexy, or toxemia.

Recovery.—Patient may completely recover; or there may be serious damage to kidneys, with albuminuria and casts for many years. Advise not to continue a subsequent pregnancy except under closest observation.

Prognosis.—When appearing early in pregnancy, the disease is worse than when developing late in pregnancy, during labor or in the puerperium. Responsibility of the physician is very great, being second only to infection. When occurring near term prognosis is best, as contractions are stimulated and uterus empties itself.

Mortality.—Mothers, from 10 to 20 percent., depending on treatment. Babies, 50 percent. or higher: 1. Usually premature. 2. Often killed by convulsions of mother. 3. Placental pressure, with œdema and hemorrhage. 4. Asphyxia, from too little O_2 in mother's blood. 5. Toxemia of mother may kill the child. Even if the child goes on to term it will be poorly nourished, but its chances outside uterus are better than inside.

Puerperal Sepsis.—A local or general pathological condition, resulting from the invasion, during labor or puerperium, of various micro-organisms, and the absorption into the system of various pathogenic bacteria, or the toxins of bacteria which are either pathogenic or non-pathogenic.

Varieties of Sepsis.—1. Septic infection (pyemia or bacteriacemia—general infection), when the bacteria themselves enter circulation, setting up local processes in different parts of the body. 2. Septic intoxication (toxemia, or sapremia—local infection), due to absorption into the blood of the toxins of living or dead pathogenic or, more commonly, non-pathogenic bacteria; is more frequent than pyemia, but may result in septic infection.

Bacteriology of the Vagina.—Secretions of the vagina are acid, due to action of numerous saprophytic bacteria; this acidity prevents growth of pathogenic bacteria, and when put into vagina

they die within twenty-four hours. Leucocytes and mucus of vagina also protect against infection.

Infection of Vagina.—During labor the liquor amnii washes out normal protecting medium; infection is also favored by congestion from downward and outward tendency of blood, child, etc. However, the gonococcus thrives in an acid medium, and when present before or after labor it may work its way upward into uterus; it may also be carried from vulva by fingers. The sterility of vagina decreases during later months of pregnancy.

Sources of Infection.—1. Most commonly from the fingers of nurse or physician, especially when physician has recently attended a case with ulcer, or infectious fever with pyogenic complications. "Long black doctor, long black bag, long black fingers, long black wagon." However, some men cannot keep surgically clean (e. g., if suffering from ozena, etc.), and in such cases rubber gloves is the only means of preventing infection. 2. Sewer gas and bad air may, but rarely do, cause infection. 3. Sexual intercourse during the last few weeks of pregnancy; the penis is not sterile, especially if seat of gonorrhea, hence abstain from indulgences after seventh month. 4. Infection may come from within, as from an old abscess of ovary or tube (rare). 5. From vulva (usually by fingers).

Varieties of Infecting Bacteria.—Streptococcus is most common and fatal cause of infection; other bacteria found are staphylococcus, colon bacillus, gonococcus, bacillus ærogenes capsulatus, and others both pathogenic and nonpathogenic. If bacteria are confined to uterus, the course of disease is short and prognosis good; if very virulent, they may go through uterus before barriers can be established.

Natural Protecting Agents.—1. Blood clots and leucocytes. 2. Healthy tissues—epithelial and connective tissues. 3. Infiltration of leucocytes under placenta, and at site of infection.

Predisposing Causes of Infection.—1. Low tone of the patient's system, from hardships, poor food, etc. 2. Long pressure of tissues during labor. 3. Hemorrhage, and presence of clots. 4. Presence of lacerations and abrasions. 5. Infectious diseases.

Site of Infection.—1. Placental site most commonly, as it is

a fresh wound with open sinuses. 2. Any laceration along the birth canal, as of cervix or vulva.

Appearances of the Case.—Depend on the form and severity of infection. 1. With septic intoxication there is very little change in appearances. 2. Septic infection: The cervix looks angry, and where lacerated is covered by a gray, sloughing membrane resembling that of diphtheria; this shows a grave infection.

Odor.—Does not necessarily accompany infection, but depends on the bacterium present. Cases with worst odor are usually simplest; however the colon bacillus causes bad odor and severe infection, while the streptococcus causes a bad infection with no odor.

Pathology.—1. Infection ordinarily extends through the lymphatics, but may travel by veins, or both; if through veins the process is more apt to be local, and the progress is better. There may be foci if infection all through uterine wall—small abscesses or local œdema, and cellulitis wherever cellular tissue. Lymphatics of uterus are most abundant just under peritoneum, hence the easy spread of infection to peritoneum. Acute cellulitis, pyogenic or simple, is a very common result of pyogenic infection. 2. The tubes may become infected by (a) the direct extension through lumen; (b) by lymphatics of broad ligaments, or (c) by peritoneum. 3. Infection may be carried by veins, with breaking down of tissues and formation or septic emboli. The trouble does not necessarily end in uterus, as uterus may clear up and patient die from abscess of liver, etc.

Symptoms.—Do not appear, as a rule, until third day; may be rise in temperature during labor without subsequent remission. If no symptoms develop within eight or ten days the case may usually be considered safe. Late cases are due to—1. Involuted cervix, with large uterus and retention of lochia. 2. Flexed uterus, with retained lochia.

Rise in temperature, over 100.6° F.: One of the first and most important symptoms. With any elevation in temperature always suspect infection, and keep it in mind until some other cause is found. A slight rise may be due to beginning of milk secretion on third day (but old "milk fever" was usually infection), and a distended breast may also cause elevation (treat by

massage, etc.). Moving the bowels after twenty-four hours may bring down temperature, and may also empty uterus of retained lochia, etc. Increase in pulse rate, with or without rigor, is also an important symptom. If uterus is emptied, temperature usually comes down; if the elevation is due to septic infection, it may continue for from one to three months, with joint symptoms, etc., and may even end in recovery.

Uterus: Size is usually large, and fundus feels boggy (subinvolution); if uterus remains small and hard prognosis is much better.

Pain: As a rule the fundus is normally sensitive to touch, but at this time it is much more so; this is an important guide.

Secretion: Lochia is generally diminished or suppressed, and the milk is decreased in amount. The lochia may be retained from other causes; if it is diminished inside of a week it is probably due to infection, while if not until after first week, Nature is at fault. Lochia may be foul.

Prophylactic Treatment.—1. Have patient in a sunny, clean room, with plenty of fresh air and free from sewer gas. 2. Have patient surgically clean, especially about the vulva and thighs. 3. Have bed, bedding, towels, etc., clean. 4. The accoucheur is the most dangerous element; have the fingers sterile, and don't use them any oftener than necessary; avoid touching vulva when examining per vaginam, and if recently from an infective or suppurating case use rubber gloves. 5. Douche: None unless woman has gonorrhea, or a sinus discharging into vagina, in which case, scrub with green soap, and use a bichlorid douche as part of the cleansing process. Otherwise douche is dangerous from (a) nonsterile douche-tip carrying dirt from vulva, etc., and (b) from washing away the natural protecting lubricant.

Active Treatment.—1. If rise in temperature, first look to bowels and breasts, and empty if necessary. If temperature remains at 102° or above, give a hot (115° F.) bichlorid intrauterine douche (1 to 5,000 or 10,000), followed by normal salt solution (teaspoonful to the pint of water), or use salt solution alone; use sterile nozzle and bag. If after six to twelve hours the temperature is still up (103° to 104°), go into uterrus with fingers (using rubber gloves if possible) or a dull curette, and ascertain if it is clean and empty. Work as gently as possible, as it is

dangerous to disturb uterus, and especially if bacteria are entering blood; but make sure that the uterus is clean, then douche out debris; don't repeat the operation. This is almost always followed by rise in temperature (105° F.), and perhaps chill. When uterus is clean, best to pack with iodoform gauze. May make culture from uterine discharge, but do not wait for report, as it may take forty-eight hours; better investigate once in mean time. 2. Use of the douche is only for mechanically emptying uterus, and not for disinfecting; to prevent sloughs from accumulating and decomposing, and thus adding sapremia to septicemia. May be used twice daily, but in sapremia, perhaps a single douche will suffice; normal salt solution is probably best.

General Treatment.—Food and medication; 1. Alcohol, in form of whiskey, is very essential, and one of best means of treatment; give ½ oz. every two or three hours. 2. Strychnin is next best drug; give 1-30 gr. every two hours, alternating with whiskey. These two drugs may be needed for from one to three months. 3. The food should be easily digestible and nourishing; milk especially should be used. 4. Serum-therapy: Antibacterial, or bacterialytic serum. Not generally advisable, as infection is usually mixed; inject 10 c. c. of serum, and repeat several times. 5. Unguentum Crede—an ointment of metallic silver; use as inunctions inside loins, using 2 dr. once daily, or, better, 1 dr. twice daily.

Radical Treatment.—1. Incisions are indicated when pus can be located (as in pelvis), and the abscess can be opened and drained. 2. Hysterectomy is rarely indicated, as more patients die with than without operation; hence never undertake it unless specially indicated, as when a collection of pus is found inside or just outside uterus. Best results are obtained usually late in the puerperal month, when pus may have become encapsulated in the uterine wall. The infection has generally gone beyond uterus to liver, spleen, kidneys, etc.; hence it is futile to remove uterus. The usual result of hysterectomy is septic peritonitis; hence never operate except as a last resort, and only with woman in good condition. Five saved out of a hundred operated is a high percent.

Phlegmasia Alba Dolens.—"Milk-leg." A painful affec-

tion (phlebitis) of leg and thigh, from obstruction to lymphatics, or veins and lymphatics, and usually due to infective processes in the pelvis.

Thrombotic Form.—1. Primary, caused by (a) pressure on blood vessels; (b) extension of thrombi from uterine sinuses; (c) slowing of blood current; (d) character of blood during pregnancy (it contains more fibrin-factors, hence clots more readily). 2. Secondary, due to septic infection of veins, causing thrombi.

Cellulitic Form.—An infection of the cellular tissue of pelvis, due to extension, through lymphatics, of various germs from the uterus; the veins become inflamed, and blood current is obstructed.

Symptoms and Diagnosis.—1. In the thrombotic form, swellings begins at feet; (a) the primary variety usually occurs in eight or ten days after delivery, but may not appear until late, especially when due to extension of thrombi from the uterus; there may be no rise in temperature; while in (b) the secondary variety there is always rise in temperature, and distress of stomach with nausea and vomiting. 2. Cellulitic form is the most severe; there is marked infection, with multiple abscesses, the disease usually ending in death. In this form, the swelling, as a rule, begins at top.

Course.—Left leg is usually affected, but right or both may be involved. Patient may not completely recover for a year, but if the delivery has been clean the disease may last but a month. Milk-leg may be caused by a low grade of infection from hysterectomy; it may also result from typhoid fever, occurring in either sex.

Prognosis.—1. In thrombotic form, prognosis is good; the clot is absorbed, but the leg (usually left) may remain swollen for a year. 2. In the cellulitic form, the danger is great, and mortality high; the muscles, etc., may slough, and require many drains.

Treatment.—Elevate leg, and apply ice bag over the veins, especially at groin (cold is better than heat); rest is of chief importance. Keep the parts covered with gauze soaked in alum acetate solution (alum, 6 parts; lead acetate, 25 parts, and water,

500 parts), to which a little opium may be added; protect the bed by covering gauze with a sheet. Have patient wear an elastic stocking for resulting swollen condition of leg.

REPAIR OF LACERATIONS.

Lateral Tears of the Perineum.—The most common; may extend through levator ani. If tear is in fourchette, and is less than 2 cm. deep, it does not necessitate suturing; if over 2 cm., sutures are required. A few stitches will close in a raw surface, and render the patient less liable to infection. Deep tears are almost always unilateral, but may be bilateral; they are never median. Superficial tears, through skin and sphincter, may be almost central. Never be satisfied with the mere inspection of vulva, but separate labia and examine the sulci.

Suturing.—Begin above at angle of tear, pass needle down and in toward center of raw area, then up and out, passing underneath wound; when the fourchette is reached, insert a crown or purse-string suture, closing in the whole.

Suture material: For inside sutures, use catgut; for fourchette and perineum, externally, use silk-worm gut, removing it in six to eight days; tie all ends together in a large knot, and cut close to knot.

Lacerations Through the Sphincter.—Result in perfect misery for both patient and physician. A rare condition, due to the too rapid extraction of child.

Repair.—Unless woman is in extreme shock, best to repair at once. Two stages of operation: 1. Suture of rectum and sphincter: Use silk-worm gut for rectum; insert needle from rectal side, across tear, and back into rectum, beginning at the upper angle and placing sutures until sphincter is reached; tie sutures on rectal side, and let ends hang out anus. This closes the inverted V-shaped opening, and restores the rectal cylinder. 2. Suture vaginal mucous membrane and perineum with catgut, inserting stitches same as in lateral tears.

Care of Bowels.—Do not allow the bowels to move for three days, giving an opiate if necessary; after third day, move the bowels, cautioning woman not to strain. To soften the stools, give small doses of salines (teaspoonful of Rochelle or Epsom

every hour) until an inclination is felt to empty bowels; then inject 3 oz. or 4 oz. olive oil and let retain, to soften lower part of fecal mass, following it later with a soapsuds enema.

Removing Sutures.—Leave sutures longer than in a shallow tear, leaving those in rectal wall for two weeks; to remove, put woman in Sim's position, use a small Sim's speculum and see sutures, then grasp ends and cut loops.

Lacerations of the Cervix.—Unless hemorrhage is severe, best not repair at once. Much experience is necessary to avoid closing cervix too tightly, and thus causing retention of the lochia. If repaired, use catgut, or silk-worm gut.

CUTTING OPERATIONS FOR DYSTOCIA.

Embryotomy.—The reduction in size of the fetus, by cutting or crushing some part of the fetal body; it generally means "craniotomy."

Indications for Carniotomy.—1. Dead child, with obstruction to advance in labor (the ideal indication). 2. When mother is in extreme danger, and child is undelivered—consider the mother first, whether child be dead or living. 3. (Doubtful) with both mother and child in good condition, but with child too large to come through passage; depends on accoucheur and his surroundings, (if with skilled assistants and good surroundings, Cesarean is indicated.) Its use should be the rarest exception. 4. Middle ground, where family object to any cutting operation on mother; if in the city, better retire from the case; if in country, must respect wishes of parents. Very rarely practiced upon the living child, as pregnancies are now more closely watched, and if necessary are terminated before term.

Technique of Craniotomy.—Separate instruments, such as Smellie's perforator and Hicks' cephalotribe, are now seldom used; the combined instrument, Tarnier's basiotribe, being now used almost exclusively.

Steps of operation: Prepare the patient as for forceps, etc., having bladder empty and parts sterile, with woman under chloroform. 1. Perforation: Introduce two fingers, and pass perforator along fingers to suture or fontanelle; then pierce skull and churn up brain to kill the child. With nurse hold-

ing perforator, introduce and lock left blade, then right blade. 2. Crushing: Upon approximating the handles, the brain substance will ooze out over perineum. 3. Delivery: Same as with forceps, following the curve of Carus and protecting the perineum. Should instrument slip, introduce cranial forceps along basiotribe, attach to skull, and exert traction; if well applied, the instrument should seldom slip.

Decapitation.—If impossible to use perforator (owing to impacted shoulder, etc.), and it is impossible to perform version, decapitation may be resorted to. With Braun's hook, pass the instrument along fingers, hook over neck and sever head; deliver body, then head. A pair of heavy, strong scissors is the best single instrument for decapitating. After decapitating, perform version, pulling down a foot; deliver the head with the basiotribe, first crushing skull.

Evisceration.—The fetal abdomen is opened and its contents removed; then the thoracic viscera are removed through the abdominal opening. Especially indicated in transverse presentation where version cannot be done. Any part of fetus may be amputated with scissors, but be careful of soft parts of mother.

Cesarean Section.—Delivery of the fetus through an incision in abdominal wall and uterus; was originally used only after death of woman. Was practiced by the ancients upon living women, but uterine wound was left unsutured; in 1876 Porro made an advance by practicing hysterectomy in addition to the celio-hysterotomy; while in 1882 Sanger introduced the operation in use at present, of closing wound in uterus with a double row of sutures.

Measurements of Pelvis.—Not necessary to examine pelvis before seventh month; at that time relative size of pelvis and head can be ascertained. If the deformity is marked, pelvis must be examined earlier than seventh month. Pelvimeter is not positive, but generally shows deformity; examination, by palpation, of head and pelvis is of most importance.

Use of pelvimeter: Have patient on back, with the pubes covered and abdomen exposed; an undervest or union suit is a handicap. 1. Distance between spines: Feel spines with thumbs, and take measurement from points just outside; in

normal pelvis the measurement increases as pelvimeter passes backward along crests; if it does not, the pelvis is probably rachitic. 2. External conjugate: Take tip of spine of last lumbar vertebra as one point (not depression below), and crest of pubes as the other. 3. Oblique diameters: From tip of left posterior superior spine to the anterior superior spine of opposite side; then with patient on opposite side, measure right oblique (right is usually longer than left); this serves as a check on measurement.

Indications for Cesarean Section.—1. Absolute, when unable to deliver in any other way, e. g., with conjugate 7 cm. or below, or with abnormally large child. 2. Relative, with a simple flat pelvis of 8½ cm., or generally contracted pelvis as high as 9 cm. Better use Cesarean in preference to any operation involving much shock, such as high forceps, etc., as mortality is lower. 3. When mother is moribund; or, stretch or cut soft parts and deliver by forceps or version. 4. After death of mother; must be done within twenty minutes, or case is hopeless; child usually dies with mother.

Indications for Hysterectomy in Cesarean Section.—1. Disease of uterus. 2. Osteomalacia. 3. Marked bleeding. 4. Disease of ovaries. 5. With obstruction too great to permit subsequent normal delivery. 6. Cancer of uterus or cervix. 7. Infection. 8. Tumors of uterus or ovaries. 9. Marked inertia, with hemorrhage which cannot be checked. 10. Ruptured uterus.

Incisions.—Prepare woman same as for any laparotomy (but often no time for thorough preparation); use soap dressing, afterwards scrubbing with soap and water, bichlorid, etc. Cervix must be dilated to allow subsequent drainage.

Incision in abdomen: Make median longitudinal incision, with assistant pressing firmly against abdominal wall on each side about level of umbilicus to prevent gush of blood when uterus is opened, and to keep abdominal wall in close contact with uterus thus preventing escape of blood into peritoneal cavity.

Incision in uterus: 1. Best is a median longitudinal cut in upper part of uterus, parallel with the abdominal wound; have assistant hold broad ligaments to prevent excessive bleeding, and extract the child as rapidly as possible. 2. Transverse incision

across the fundus (Fritsch); is objectionable, as the abdomnial incision must be very large to allow uterus to roll out. Has advantage of less bleeding, with less danger of tearing. Incision in abdomen must be high up, with umbilicus at its center.

Sutures.—Usually best to deliver uterus through abdominal wound to suture; have assistant compress broad ligaments to check bleeding. Use catgut throughout (silk is no longer used). 1. Make first line of sutures in muscular tissue of uterus, being careful to avoid endometrium; use continuous line of stitches, interrupted in two or three places. This checks most of the bleeding. 2. Second line is continuous, including peritoneum and superficial muscles. 3. Close peritoneal wound by a continuous Lembert suture; this prevents adhesions of uterus to abdominal wall. Draw omentum down as far as possible over uterine wound; this renders adhesions less liable. 4. Close the abdominal wall in any approved manner, being careful to bring together like tissues.

Symphysiotomy.—The division of the symphysis of a woman in labor, for purpose of enlarging the pelvis and securing the delivery of a living child. Was suggested as early of 1598, but was first successfully used in 1777, by Sigault in Paris. In 1892 the operation spread from France, but it was little used until 1899, when a paper read before the International Congress showed the mortality to be a little over 14 percent. for both mothers and babies, 10 percent. for mothers alone and 18 percent. for children. However, the operation does not compare with Cesarean for safety, it having a mortality of but 7.5 percent. for both mothers and babies. The operation is not complete in itself, as there is still the uncertainty of delivering child; another objection is the tiresome position of woman for three weeks—with hips bandaged together and in a trough bed; there is a long convalescence, with a wabbling gait for six or eight weeks. Symphysiotomy is generally to be condemned.

Indications.—Operation has a small field, midway between Cesarean section and the induction of premature labor, or version. Not an operation of election, but is determined on during labor, when head is impacted and only a little more room is required, and where forceps cannot be used. It is indicated

with conjugates from 8 cm. to 9.5 cm., but never when below 7 cm. or 8 cm.

Results of Operation.—Upon dividing symphysis the pubic bones separate, going outward and downward; they may be separated as much as 2½ in., but avoid straining the sacro-iliac ligaments. The pelvic canal is enlarged ½ in. in conjugate, ¾ in. in transverse and 1 in. in oblique diameters.

Technique.—Italian operation: Make small incision above pubes, large enough to admit finger, and separate tissues from posterior surface of symphysis down to bottom; introduce a Galbiati's sickle-shaped knife along finger, and cut upward and forward. Have catheter in urethra, holding it to one side.

French operation (open): Make skin incision from base of symphysis down to clitoris; pass a broad grooved director behind symphysis, and incise either toward the front or back. A complete open incision is not advisable; avoid soiling the wound with lochial discharge. If ankylosis has taken place the bones may be separated with the saw.

The subpubic ligament must be cut or there will be little separation; have assistant support trochanters to avoid more than 2½ in. diastasis. Deliver child by forceps or version after separation of bones. If oozing of blood occurs, pack wound with iodoform gauze until after delivery; this also prevents injury to bladder during delivery. It is not necessary to suture bones or periosteum; simply bring surfaces into close apposition, being careful to push bladder back out of way, and suture tissues immediately over wound in bone; silver wire is not much used at present time. Put on a firm zinc oxide bandage, passing around trochanters.

After-Treatment.—Bed should be trough-shaped; a hospital stretcher, with flap for hips, is good; or may suspend patient in a hammock stretcher. A hard bed may be used by placing sand bags at either side of patient. Keep patient in trough at least three weeks, then one week on a hard bed, after which she may sit up with a strong bandage about hips. She has a wabbling gait for six to eight weeks, and does not completely recover for six months. Incontinence of urine or fistulæ may result from injury to bladder.

ECTOPIC GESTATION.

Definition.—"Gestation out of place." Not necessarily outside of uterus, as may be in interstitial portion of tube; hence "extra-uterine" is a bad term.

History.—Was first noted in eleventh century—a case with the fetus working its way through the abdominal wall. Was described in sixteenth century, and in seventeenth century a distinction was made between primary and secondary abdominal pregnancy; one case was autopsied, the woman having died from rupture of tube. In 1752 Bohmer made about same classification as is used today—tubal, ovarian, and abdominal.

Frequency.—Formerly thought to be very rare; in 1883 Lawson Tait performed first successful operation; Cragin has operated thirty-five cases (five vaginal and thirty abdominal operations) in 500 laparotomies.

Position of Ovum.—1. Primary: (a) Tubo-uterine, or interstitial; (b) tubal proper, or true tubal; (c) tubo-ovarian. 2. Secondary, from escapement of ovum from tube.

Normal Site of Impregnation of Ovum.—In lower animals, the impregnation occurs in tube; spermatozoa have been found in abdomen around ovary in from three to twenty hours after insemination. In one case, of a girl killed sixteen hours after copulation, spermatozoa were found in fimbriated end of tube.

Etiology of Ectopic Pregnancy.—Due to some hindrance to passage of impregnated ovum to the uterus. 1. Something in lumen of tube delaying ovum while it develops: (a) Polypus of mucous membrane; (b) stricture; (c) disease of mucous membrane and damage to the cilia; (d) diverticula of tube—funnel-shaped depressions due to congenital malformation. 2. Something in the wall of tube—thickening, as a result of disease, interfering with vermicular action. 3. Causes outside tube: (a) Pressure on tube from tumors; (b) traction on tube from adhesions (probably one of most common causes). 4. Something in the ovum itself: (a) Increase in normal size, as from twin impregnation; (b) delay in progress from abnormal dis-

tance to be traveled; as from abnormally long tube, or from external migration (e. g., when one tube and opposite ovary have been removed).

Multiple Ectopic Pregnancy.—1. May be double impregnation in same tube at same time. 2. One octopic and one uterine pregnancy. 3. May be successive impregnation in same tube, the first ovum dead. 4. May be one in each tube.

Time of Occurrence.—Rarely occurs soon after marriage—only three of forty-three cases occurred in first impregnation. Usually follows a long period of sterility.

Changes in Uterus.—About same changes occur as in normal pregnancy, but are less marked; the uterus increases in size, but less rapidly than normal. Venous hue of cervix is not so maked, but the nearer ovum is to uterus the deeper the hue.

Decidua.—Decidua vera is formed, but serotina and reflexa are absent. The decidua is usually cast off at the seventh or eighth week, accompanied by more or less metrorrhagia; it may come away in shreds or in toto. The decidua is smooth toward uterine cavity, and shaggy toward wall; is composed of large cells with nuclei at center, and little intracellular substance (important in diagnosis); there are no chorionic villi.

Changes in Tube.—A decidua is formed. It is rare to have a tubal decidua in normal uterine pregnancy, but may be a few cells; also rare to have a decidua in normal tube with tubal pregnancy. Hence formation of decidua is probably due to reaction from lodgement of ovum. When lodgement of ovum is between fimbria and uterus, the osteum abdominale closes in eighth week; if ovum lodges in fimbriated end, the osteum remains open.

Development of Ovum.—For a certain time growth is same as in normal pregnancy.

Amnion and Chorion.—Develop same as in uterus. Amount of decidua formed varies greatly, the amount determining perfection of placenta. Chorionic villi are easily separated owing to poor attachment, and the escaped blood usually kills fetus, resulting in the "tubal mole"; the dead ovum may—1. Remain

in tube. 2. May be absorbed. 3. May be deposited in abdomen from rupture of tube.

Tubal Mole.—Important to differentiate it from blood clot. On section, shows a smooth cavity (amnion) containing more or less of fetus. The most important feature is presence of chorionic villi; these are little finger-like projections, covered with two layers of cells—an inner layer composed of single large nucleated cells arranged side by side with cell walls (Langhan's layer), and an outer layer of protoplasm in which are embedded nucli at irregular intervals (syncytium); in center of villi is a small amount of connective tissue and blood vessels.

Symptoms of Ectopic Gestation.—Symptoms are not always distinct, but must be kept well in mind.

Menstruation.—Usually a disturbance in menstruation, but may not be, as when abortion occurs just previous to period next following impregnation.

Symptoms of Pregnancy.—Not of much value, as they are absent if rupture occur early; are most pronounced after eighth week.

Pain.—If a married woman have sharp pelvic pain with symptoms of internal hemorrhage (faintness, etc.), always think of octopic pregnancy; if a mass is felt at side of pelvis the diagnosis is confirmed.

Passage of Decidua.—Occurs about time of abortion; is an important aid to diagnosis if found, but membrane of menstruation may confuse, hence get history.

History of Sterility.—There is usually a history of previous sterility, but ectopic pregnancy may occur as early as two to five months after marriage.

Symptoms of Ectopic at Different Periods.—The symptoms of ectopic pregnancy in the different periods are best considered separately.

Symptoms Before Rupture or Tubal Abortion Occurs.—Often no symptoms besides—1. Signs of normal pregnancy. Gynæcologist may find—2. Large tube at side of uterus, and in and about tube—3. Vessels seem to pulsate more than normally. As a rule ectopic is not diagnosed before rupture.

Symptoms at Time of Rupture.—1. Disturbance of menstrual periods. 2. Symptoms of pregnancy, followed by—3. Sudden sharp pain without fainting, and—4. Passing of shreds from uterus. 5. Usually a history of long period of sterility. 6. May find as a cause of rupture or abortion something increasing tension of sac, as (a) straining at stool; (b) heavy lifting; (c) sexual intercourse; (d) examination by gynæcologist. 7. Symptoms of shock and hemorrhage: (a) Blanching; (b) rapid pulse; (c) pallor of lips; (d) dry tongue; (e) subnormal temperature.

Physical signs: Signs vary with direction hemorrhage has gone; may go in two main directions from tube. 1. If into periotoneal cavity (tubal abortion or rupture), signs may be absent; but may note (a) free blood or fluid in abdomen (not easily made out), and (b) tender abdomen. 2. If into folds of broad ligament (a) tumor is felt; (b) uterus pushed upward, forward and to side opposite hemorrhage; (c) may be bulging downward into vagina.

Signs and Symptoms After Rupture.—A tumor is generally felt whether blood has gone upward or downward. 1. If bleeding has been into abdominal cavity the clot may be roofed in by adhesive peritonitis, and feels like a large tube surrounded by mass of blood clot. The mass on compression between fingers gives sensation of soft snow ball. 2. If hemorrhage is in the broad ligament, tumor is firmer. On examining per rectum, the tumor is found to be in broad ligament, and uterus is displaced upward and to opposite side; feels like a stricture of rectum.

Differential Diagnosis.—It is very important to differentiate ectopic gestation from other conditions; the hemorrhage may kill quickly, but usually not for ten or twelve hours; if any doubt exists as to diagnosis, it is justifiable to make a small opening in posterior fornix to ascertain if hemorrhage has occurred. Diagnosis is apt to be confused with miscarriage of normal uterine pregnancy, as both have pain, etc. From ovarian cyst complicating normal pregnancy the differentiation is not important, as both require abdominal section. A fibroid at side of uterus may be very confusing.

Ectopic Gestation	vs.	Miscarriage.
Hemorrhage and pain.		Hemorrhage and pain with something from uterus.
Only decidua is discharged from uterus, with no villi (these remain in the tube or abdomen); decidua may be a cast of uterus.		Chorion is expelled, and perhaps some of ovum.
Usually find a mass at side of uterus before and after rupture.		No mass is felt at side of uterus.
Symptoms of internal hemorrhage.		None.

Ectopic Gestation	vs.	Ovarian Cyst with Pregnancy.
History of pregnancy, with no previous mass in pelvis.		History of pregnancy and mass at side of uterus.
Rupture—signs of hemorrhage, but not of inflammation.		Twist of pedicle—signs of inflammation, pain and tenderness.

Ectopic Gestation	vs.	Salpingitis.
Menstruation disturbed—may be a slight discharge.		Menstruation not stopped; it may be increased.
Tube enlarged, with pulsations.		Feel distended tube, with no pulsation.
Decidua expelled.		No expulsion of decidua.

Ectopic Gestation	vs.	Fibroid at Side of Uterus.
Tumor is soft.		Tumor is hard.
Not closely connected with uterus.		Tumor is intimately connected with uterus.

Results of Ectopic Gestation.—Pregnancy is usually originally tubal, starting in one of three places in tube. There may be one of two results: 1. May be slight hemorrhage, and ovum and membranes be absorbed (rare). 2. Ovum may escape from tube (a) at fimbriated opening (tubal abortion); (b) or by rupture of tube (tubal rupture). "Tubal abortion" occurs within eighth week; "tubal rupture" usually occurs within twelfth week, but isthmus may rupture earlier while the interstitial portion of the tube may not rupture for from four to six months.

Direction of Escape of Ovum.—May go—1. Out of fimbriated end of tube into abdominal cavity without rupture. 2. Out of inner or uterine end (rare). 3. Upward into peritoneal cavity through rupture in wall of tube. 4. Downward between folds of broad ligament through rupture in tube.

Source of Hemorrhage.—1. Fetal: May be some blood from chorion, resulting in "blighty ovum." 2. Maternal: More severe than if from fetal structures; due to (a) separation of ovum and its expulsion through fimbriated end (tubal abortion); or (b) from rupture of tube. The hemorrhage of tubal abortion is less than in rupture, as in latter large vessels may be opened.

Results of Hemorrhage.—1. Tubal abortion: Blood goes into peritoneal cavity; may be enough to kill. Blood clot makes tumor in pelvis, and may be gradually absorbed. 2. Tubal rupture, (a) ovum in ampulla and rupture in upper wall of tube: Hemorrhage increases tension and causes rupture; the ovum may plug up rent in tube, when there will be attacks of pain and syncope followed by temporary recovery as bleeding is checked; this may be repeated several times, but finally a big hemorrhage occurs and woman dies, the blood escaping unchecked and unlimited in amount into the abdominal cavity. Rent may be plugged by clotting of blood, and adhesions may form. (b) When blood escapes downward into broad ligament, the amount of blood may be checked by limitations of space.

Fate of Ovum.—Separation from walls of tube usually kills ovum, whether it escapes in an upward or downward direction. At times separation may be so gradual that membranes are not ruptured, and the ovum is displaced intact from walls of tube to peritoneum where it becomes attached and develops (rare).

Treatment of Ectopic Gestation.—The old method of killing fetus by electricity or by injections of morphin is not now used, as it is dangerous from—1. Rupture of sac at time of operation, from manipulation. 2. Danger of rupture of tube up to two years after death of fetus.

Treatment Before Rupture of Tube.—As soon as diagnosis is made, prepare woman for laparotomy. Abdominal section is much simpler and safer than vaginal operation as—1. There are few adhesions. 2. Field of operation is aseptic.

Preparation of abdomen: Should be same as for Cesarean. Direct nurse to apply a gauze dressing soaked in strong soap suds, or tincture of green soap (1 in 10), and leave on for six hours (over night); this softens superficial layer of skin, but be on guard for irritation. In the morning, scrub off abdomen and apply a wet bichlorid dressing, to be left on till operation. Shaving may be done after soap dressing is removed, but best to leave it until patient is under anæsthetic to avoid nervous shock. When patient is on table, shave, and scrub again with soapsuds, alcohol or ether, and bichlorid. Advantages of extra precaution—1. Avoids infection of blood clots. 2. Permits immediate closure of abdomen.

Operation is performed in three steps: 1. Tie off ovarian artery on pregnant side (uterine artery is not ligated). 2. Tie off tube close to uterus. 3. Remove pregnant tube and treat the stump.

Treatment at Time of Rupture.—Woman may mistake rupture for miscarriage; it may occur while at stool, in bed, anywhere. Make the diagnosis early, and if woman is faint from loss of blood, give infusion; death may occur as early as two hours after rupture, hence act at once. Scrub thoroughly, especially umbilicus, with soapsuds, alcohol, ether and bichlorid, and surround field of operation with sterile towels. A mass may not be felt, the only guides being symptoms of hemorrhage, restlessness, dry mouth, rapid pulse, and point of tenderness; but when peritoneum is reached, the dark color of old blood underneath will be seen.

When peritoneum is opened, blood may gush from wound, but *don't stop to mop it out*—go down to side thought to be at fault, grasp tube with one hand and draw it up into abdominal wound; then proceed to ligate ovarian artery in infundibulo-pelvic ligament, and tie off the tube close to horn of the uterus.

Now take time to clean out blood and clots; best way is to flush out with salt solution. Not necessary to remove all of fluid but best to get most of it out; it does good if absorbed. Drainage is not necessary as a rule, as any blood or salt solution remaining will be absorbed. If the hemorrhage is down between folds of broad ligament, ligate in sections all of ligament involved; the blood may extend to bottom of ligament and even much deeper.

After operation woman may be in a state of collapse and very white; give strychnin, and saline infusions.

Treatment After Rupture.—1. Seven to ten days after tubal abortion: If tube is getting smaller and products are being absorbed, leave to Nature; exceptional cases may need treatment. 2. When two or three ruptures have occurred: If tubal mass is large and still sensitive, best to remove pregnant tube, as it probably still contains fetus and a fatal hemorrhage may occur at any moment.

Treatment of Rupture Between Folds of Broad Ligament.—1. If in one or two weeks after rupture the woman is improving and mass is growing smaller, best to leave alone (same as in tubal abortion). 2. If there have been successive hemorrhages and mass is growing larger, go in through abdomen and tie off ligament (impossible to reach the bleeding point through vagina if high up). 3. Infection may have occurred from the rectum (colon bacillus), with the sac breaking down into pus; make a large opening through posterior fornix, break up septa and evacuate pus.

Ectopic Pregnancy with Living Child.—The exit of ovum may be so gradual from tube that life continues.

Diagnosis.—May be difficult to tell at third or fourth month whether child is alive or dead. If at sixth month, and woman thinks she is normally pregnant—1. Get history; at some time prior to twelfth week there may have been sharp pain, symptoms of internal hemorrhage, and passage of decidua; "If such a history is obtained, look out for what woman has in pelvis." 2. May feel mass to be at one side. 3. If certain enough to use probe, uterus will be found empty; but do not attempt it until ready to operate. 4. Fetal movements are more distinct than in normal pregnancy. 5. Placental souffle is perhaps more distinct than normal. 6. Child is felt distinctly through abdominal wall (only tissues of wall between hand and child).

Management.—Sloane Maternity has had four cases, with two of the children living five months or longer. Child is more apt to be deformed than if normal pregnancy; but best to give child a chance. If nature of pregnancy is discovered before sixth month, best to remove child; if not until sixth month or after,

best to leave alone, as convalescence of mother from laparotomy near term will be as good as if the child is removed earlier.

Time to Operate.—Best time is about two weeks before term, to prevent "spurious labor," which may cause—1. Pressure on fetal skull due to lack of liquor amnii. 2. Pressure may kill child. 3. Pressure may rupture sac.

Incision.—Most common situation of the ovum in advanced cases is in broad ligament; the peritoneum is stripped from back and sides of uterus. Hence make incision low down, as stripping up of peritoneum may allow an extra-peritoneal incision. Select part of sac which is least vascular, incise, and remove fetus.

Management of Placenta.—May be adherent to a large surface of abdomen, covering intestines, ureters, iliac vessels, etc., and hence be very dangerous to remove. After incising sac, ascertain if it is possible to ligate arteries supplying placenta; if supplied by ovarian artery it can be easily removed. Unless vessels can be ligated, best to leave placenta in situ; stitch the sac to opening in abdominal wall, and pack with gauze. Within a week placenta may be gradually separated from day to day; keep sac well washed out, and drained with gauze. After placenta is removed, keep sac packed with gauze, and let heal from the bottom by granulations.

Treatment After Death of Child.—Watch carefully for any evidences of infection; if no signs appear, wait two or three weeks. Uterine souffle has then ceased, and operation is safer, as circulation has stopped and placenta is easily shelled out.

Ovarian Pregnancy.—Rare; only six cases in history. Due to impregnation and development of the ovum while still in Graafian follicle. History of case up to rupture is same as in tubal pregnancy; the development may go on an indefinite time before rupture occurs.

Abdominal Pregnancy.—1. Primary: The impregnation takes place in abdominal cavity on first lodgment of ovum. Only a few cases on record; in one case fetus and placenta were up near spleen, while the uterus and both tubes were normal; in another case the uterus had been removed, leaving ovaries, and insemination had occurred through a sinus left in vault of vagina.

2. Secondary: When initial lodgment of ovum has been in some other place, and it has escaped into abdomen after impregnation has taken place; not a rare condition. If point of rupture of tube is between folds of broad ligament, escape of ovum may be gradual and life continue; a secondary rupture may then take place, the child escaping into abdominal cavity. Most cases of full term ectopic have thus developed in broad ligament (intraligamentous pregnancy). There may be a secondary abdominal hemorrhage from the rupture of broad ligament, which may cause death of woman.

Pregnancy in Uterus Bicornis.—If cavity of horn is not too much separated from cavity of uterus, the pregnancy will progress normally. If pregnant horn is separated by a narrow canal, result is practically a tubal pregnancy; if found early, abortion may be performed; if not discovered and treated early, the horn may rupture, with same symptoms, and requiring same treatment, as tubal rupture.

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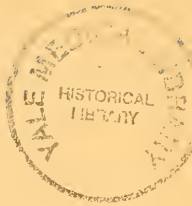

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